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Syphilis in the Illness of John Hunter

IRVINE J. HUNTER*

IT is well known that John Hunter inoculated himself with syphilis in the belief that he was giving himself gonorrhoea, and that as a result he was confirmed in his erroneous belief that the poison was the same in "the gonorrhoea" and "the chancre."

Probably the subject from whom he obtained the infective material had gonorrhoea as well as syphilis, although there is a possibility that the pus was caused by some other pyogenic organism. Power (1925) suggested that the short incubation period before the appearance of the sore and the bubo indicates that the bacillus of soft sore was present.

Hunter tells us of this experiment upon himself in his work *A Treatise on the Venereal Disease*, first published in 1786. He scarified his penis with a lancet dipped in the pus both on the glans and on the prepuce. This was in May 1767. A bubo appeared in the right groin. Later, secondary syphilis made itself manifest in the form of a rash and of an abscess on one of his tonsils. The sores on the penis he treated with lunar caustic and calomel ointment, and for the other manifestations he rubbed mercurial ointment into his right lower limb with a view to modifying the disease but not to completely curing it. When treatment was ceased, these lesions recurred. Finally, about three years after the beginning of his experiment, he rubbed in the ointment in order to cure himself of the disease.

All these facts are well known. The question that arises is to what extent, if at all, was his subsequent heart disease caused by tertiary syphilis? Several years ago the writer formed the opinion that the cardiac pain, from which he suffered for years, and ultimately his death were not caused by syphilis but by the degenerative changes of atheroma, and this idea was put forward in the course of an article entitled "John Hunter (1728-1793) and Venereal Disease" published in the *Sydney University Medical Journal* in 1948.

Belief in a syphilitic origin of his cardiac trouble appears to be fairly widespread.

Ottley (1837) apparently regarded it as being of a "gouty" nature (see later), while Pettigrew (1838) said that John Hunter's illness exhibits the history of a complete case of angina

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pectoris "or that affection which is frequently found to arise from an ossified condition of the coronary arteries of the heart." That angina pectoris was caused by coronary arterial disease was recognized by Edward Jenner, who performed necropsies on two cases with symptoms similar to Hunter's, but because of his friendship for Hunter he did not make this public, nor tell him of it (Gloyne, 1950). However, Lewis has maintained that Jenner attributed the symptoms to the structural changes in the vessels themselves rather than to the consequent interference with blood flow (LeFanu, 1951).

By the irony of fate it was Hunter himself who performed the first autopsy on a patient diagnosed as having angina pectoris—in 1772, the year before the first onset of his own cardiac pain, at the request of William Heberden, who first defined this condition clinically, and gave it its name (Segall, 1945). It was not, however, until the present century that the syndrome of coronary occlusion was clearly separated from the syndrome of angina pectoris. The coronary arterial disease in the case examined by Hunter was evidently restricted in extent, and so was not found by him. Possibly the pain was caused by a single atheromatous plaque in a branch of one of the main coronary arteries, the changes in the rest of the coronary tree being not very marked. Thus it was left for Jenner to correlate anginal pain with disease of the coronary arteries.

Paget (1897) neither mentioned Hunter's inoculation of himself with syphilis, nor commented upon the cause of his anginal pain. His inoculation of himself with lues was mentioned by Peachey (1924), but the cause of his ill health was not discussed, and the same applies to Sigerist (1933).

Osler (1897) in his *Lectures on Angina Pectoris,* although he held the opinion that syphilis could be a potent predisposing factor in atheroma of the coronary arteries, did not associate John Hunter's anginal attacks with his inoculation of himself with syphilis.

In the Hunterian Oration of the Royal College of Surgeons of England in 1911 Owen regarded Hunter's arterial disease as being undoubtedly syphilitic, and said that the irritability of his later years was also caused by this disease.

The chief exponent of a syphilitic origin for the arterial disease which caused John Hunter's death was Sir D'Arcy Power, who, in his Hunterian Oration of 1925, seems to have been the only one to have considered the matter in detail. He said that up till then it had been assumed that Hunter's cardiac disease was non-

syphilitic—since the time of this Oration it has apparently been assumed that Power was correct in regarding Hunter's condition as syphilitic, and a syphilitic aetiology has been widely accepted. Although he has been largely responsible for the misconception regarding Hunter's cardiac disease and death, the merit of Power's oration is that he points out that Hunter suffered from a syphilitic affection of the brain.

A syphilitic origin for his coronary arterial disease has been accepted by Singer (1928), Russell (1939), and Gloyne (1950), and also apparently by Keith (1936), who hints that his self-inoculation was "of too costly a nature." Gray (1952) quotes Power's opinion as authoritative.

Guthrie (1945), however, makes no comment upon the aetiology of his cardiac condition, and notes the fact, which is not widely known, that he suffered from cerebral syphilis.

The only voice raised in protest against Sir D'Arcy Power's theory that syphilis caused the cardiac trouble appears to have been an editorial article in the *British Medical Journal* a few weeks after the Oration.

Hunter was quite sure that he cured himself of the disease, stating emphatically in his lectures "I knocked down the disease with mercury and I killed it [Ottley, 1837, p. 47]."

Death came to John Hunter on 16 October 1793, there being little doubt that it took the form of a coronary occlusive attack with ventricular fibrillation. He had lived for sixty-five years and eight months.

His first attack from coronary arterial disease probably occurred in the spring of 1773, when he appears to have had an occlusive episode. This was six years after he contracted syphilis, and at this time he was forty-five years old. Antisyphilitic treatment had been discontinued three years previously.

The next bout of serious illness was four years later in 1777,[1] but this episode was of a cerebral nature. Cardiac pain returned in 1785, and in the later years of his life he had recurrent attacks of angina pectoris, which increased in frequency, until finally he succumbed to an occlusive attack, over twenty years after the onset of symptoms of coronary disease.

Clinically, there are several points in this case history which throw some doubt on the likelihood of it being syphilitic in origin. Firstly, the onset was rather sooner than is usual in syphilis, fifteen

[1] Home said 1776, but letters from Hunter to Jenner make it evident that it was 1777. See Ottley, 1837, p. 62 *et seq.*

to twenty years being a more typical time interval between the primary sore and the onset of symptoms of aortic disease, although the possibility must be borne in mind of his having previously contracted the disease apart from his self-inoculation. It is the course of the disease, however, that is the chief point against its syphilitic nature. In the absence of prompt and efficient treatment the prognosis of syphilitic aortitis, especially when certain features such as angina pectoris are present, is bad, yet Hunter lived for over twenty years after the first attack. Moreover, the first attack was apparently a severe one, a coronary occlusive attack which came on without any warning, and after this he was at first entirely and then relatively free from attacks for some years before the syndrome of angina of effort became established. This clinical course suggests strongly that the coronary arterial disease had an atheromatous rather than a syphilitic basis, but the convincing evidence is to be found in the discoveries made at necropsy.

Towards the end of his life his temper became worse, but he was mentally alert and between attacks was working harder than ever both at his practice and at his researches. There is no hint that he suffered from breathlessness or had any symptoms of failure either in the output of the heart or in its adaptation to the inflow of blood.

Ottley (1837) gives the following account of the condition found at necropsy:

> . . . the viscera of the belly and head were found loaded with blood, but otherwise nearly in a natural state, with the exception of the carotid arteries and their branches within the skull, which were in parts thickened and ossified. In the chest, the left lung had become attached to the costal pleura by old and firm adhesions; but the heart was found to be the chief seat of disease. The pericardium was unusually thickened, but did not contain much fluid. The heart itself was small, appearing too little for the cavity in which it was contained, its diminished size being the result of wasting, and not of strong contraction of its fibres. Two opake white spots were seen on the left auricle and ventricle. The muscular structure of the organ was pale, and loose in its texture. The coronary arteries had their branches which ramify through the heart converted into long tubes, with difficulty divisible by the knife. The mitral valves were much ossified. The aorta was somewhat dilated, its valves thickened and wanting pliancy, and the inner surface of the artery was studded with opake and elevated white spots.

A much fuller account is to be found in Home (1794), from which Ottley's account was presumably taken:

> Upon inspecting the body after death, the following were the appearances: the skin in several places was mottled, particularly on the sides and

neck, which arose from the blood not having been completely coagulated, but remaining nearly fluid.

The contents of the abdomen were in a natural state, but the coats of the stomach and intestines were unusually loaded with blood, giving them a fleshy appearance, and a dark reddish colour; those parts, which had a depending situation, as in the bottom of the pelvis, and upon the loins, had this in greater degree than the others; this evidently arose from the fluid state of the blood. The stomach was rather relaxed, but the internal surface was entirely free from any appearance of disease; the orifice at the pylorus was uncommonly open. The gall-bladder contained five or six small stones of a light yellow colour. The liver and the other viscera exhibited nothing unusual in their appearance.

The cartilages of the ribs had in many places become bone, requiring a saw to divide them. There was no water in the cavity of the chest, and the lungs of the right side were uncommonly healthy; but those of the left had very strong adhesions to the pleura, extending over a considerable surface, more especially towards the sternum.

The pericardium was very unusually thickened, which did not allow it to collapse upon being opened; the quantity of water contained in it was scarcely more than is frequently met with, although it might probably exceed that which occurs in the most healthy state of these parts.

The heart itself was very small, appearing too little for the cavity in which it lay, and did not give the idea of its being the effect of an unusual degree of contraction, but more of its having shrunk in its size. Upon the under surface of the left auricle and ventricle, there were two spaces nearly an inch and half square, which were of a white colour, with an opaque appearance, and entirely distinct from the general surface of the heart: these two spaces were covered by an exudation of coagulating lymph, which at some former period had been the result of inflammation there. The muscular structure of the heart was paler and looser in its texture than the other muscles in the body. There were no coagula in any of its cavities. The coronary arteries had their branches which ramify through the substance of the heart in the state of bony tubes, which were with difficulty divided by the knife, and their transverse sections did not collapse, but remained open. The valvulae mitrales, where they come off from the lower edge of the auricle, were in many places ossified, forming an imperfectly bony margin of different thicknesses, and in one spot so thick as to form a knob; but these ossifications were not continued down upon the valve towards the chordae tendineae.

The semilunar valves of the aorta had lost their natural pliancy, the previous stage to becoming bone, and in several spots there were evident ossifications.

The aorta immediately beyond the semilunar valves had its cavity larger than usual, putting on the appearance of an incipient aneurism; this unusual dilatation extended for some way along the ascending aorta, but did not reach so far as the common trunk of the axillary and carotid artery. The increase of capacity of the artery might be about one-third of its natural area; and the internal membrane of this part had lost entirely the natural polish, and was studded over with opaque white spots, raised higher than the general surface.

On inspecting the head, the cranium and dura mater were found in a natural state. The pia mater had the vessels upon the surface of the two hemispheres of the brain turgid with blood, which is commonly found to be the case after sudden death.

The internal structure of the brain was very carefully examined, and the different parts both of the cerebrum and cerebellum were found in the most natural and healthy state; but the internal carotid arteries as they pass by the sides of the cella tursica were ossified, and several of the ramifications which go off from them had become opaque and unhealthy in their appearance. The vertebral arteries lying upon the medulla oblongata had also become bony, and the basillary artery, which is formed by them, had opaque white spots very generally along its coats.

Home adds: "From this account of the appearances observed after death, it is reasonable to attribute the principal symptoms of the disease to an organic affection of the heart. That organ was rendered unable to carry on its functions, whenever the actions were disturbed, either in consequence of bodily exertion, or affections of the mind."

The pleural adhesions on the left side were presumably caused by the pulmonary trouble in 1759 in consequence of which he went overseas. There is no definite evidence that this was tuberculous.

No doubt the myocardium had undergone structural changes as a result of the long-continued poor blood supply, but the report of the necropsy suggests that Hunter's coronary occlusive episodes were not associated with any well-marked infarcted areas in the heart wall. The opaque white areas of the visceral pericardium with some fibrin on their surfaces may have been so-called "milk-spots," the significance of which is doubtful, although the presence of fibrin is difficult to account for on this basis.

The most important point is the extensive calcifying disease of the coronary arteries. This is diagnostic of atheroma. Syphilis rarely, if ever, affects the more peripheral parts of the coronary arteries, and when it does affect arteries, the lesions are not characterized by calcification.

The calcification of the mitral and aortic valves, although it may co-exist with syphilis, is likewise not a syphilitic change, but possibly of a similar nature to atheroma occurring in vessels. There is nothing in Home's description which justifies the postulation of a syphilitic lesion of the aortic valve.

The generalized dilatation of the aorta, again, commonly occurs in advanced atheroma. A diffuse type of dilation may be caused by syphilis, although this can be equally well explained as purely atheromatous, but in syphilis an aneurysm is often of the saccular type. The weakened arterial wall is to a large extent composed of less effective scar tissue, and this by contraction may lead to a

puckering and the commencement of a saccular aneurysm, which initially is localized to one portion of the wall.

The opaque raised white spots, also, would be atheromatous deposits in the degenerated intima. The entire loss of "the natural polish" of the wall could be explained by advanced atheroma, but it may indicate that the pearly compensatory intimal fibrosis of syphilitic aortitis was present as well. This and the dilation of the beginning of the aorta, discussed above, supply the only evidence upon which might be based a supposition that the lesion was a mixed one.

Atheroma may produce angina pectoris either by narrowing the mouth of a coronary artery or by involvement of the artery itself, whereas syphilis produces the cardiac pain of this condition by cicatricial narrowing of the mouth of the artery. In the detailed and exact description of the naked-eye appearances given by Home there is no mention of distortion of the mouths of the coronary arteries, nor of the puckering of the aortic wall characteristic of long-standing syphilitic inflammation.

In men below the age of forty, syphilis is to be expected as the cause of angina pectoris, but Hunter was forty-five at the time of his first attack, so that clinically both the age of onset and the course of the disease, discussed above, are suggestive of atheroma. The necropsy leaves little room for doubt, revealing an extensive atheromatous basis for the pain, with no obvious distortion of the mouths of the arteries to suggest that syphilis was a contributing factor to the coronary insufficiency.

The presence of gallstones is possibly of significance, as it appears that this condition may increase the likelihood of attacks of cardiac pain.

The arteries on the base of the brain were also extensively affected by atheroma, but this is a common necropsy finding after middle age. A careful examination of the brain failed to find any naked-eye evidence of abnormality, so there could have been no obvious meningeal thickening, and it seems that gumma, brain tumour, and other space-occupying lesions can be excluded as a cause for his cerebral symptoms.

The lesions in the brain were microscopic and will never be known to us, so we must form our opinion on this matter on clinical grounds alone.

The legend that the pain that was the bane of his later years, and his sudden dramatic death at the board meeting of St. George's

Hospital, were the result of Hunter's experiment with venereal disease is probably a legacy from the time when atheroma was thought to be syphilitic in aetiology. This view was held until comparatively recent times. Thus, for instance, Lazarus-Barlow (1903), while admitting that atheroma may occur apart from syphilis, said that there is no doubt that syphilis is an important factor in the production of this condition; and Coplin in 1911, six years after the discovery of the *Treponema pallidum* by Schaudinn, said that atheroma of the coronary arteries is often associated with syphilis and may constitute a part of the changes found in this disease.

In the days when tertiary syphilis was of more common occurrence, aortitis from this cause was often associated with atheroma, as can be seen from specimens in pathological museums. This is explained by the fact that death, whether from the tertiary syphilis or apart from it, often occurred after the age of forty, when a greater or lesser degree of atheroma is a very common necropsy finding.

John Hunter, then, died from a senile condition of his coronary arteries and cannot be regarded as a "martyr to Science" in the sense intended by Power. Nevertheless, it is probable that as a result of his heroic experiment, he was affected, as Owen (1911) and Power (1925) have suggested, by syphilitic disease of the brain.

In contrast to the striking evidence offered by the account of the necropsy in regard to his cardiac condition, we have in this matter nothing but the clinical symptoms to guide us, and as they are far from typical, no dogmatic conclusion can be reached, and the matter must always be open to some doubt. The fullest account of his symptoms is also to be found in Home (1794), much of the account being based on records written or dictated by Hunter himself.

In 1759 John Hunter had the pulmonary trouble as the result of which he went overseas. We are told that he was healthy from then until 1773, apart from regular attacks of "gout" in the spring of the previous four years.

Gout was known to the ancient Greeks, although probably other conditions were confused with it. It is mentioned in the works of Hippocrates,[2] and a graphic description of its symptoms had been

[2] For example in the *Aphorisms*, V, 25, and VI, 28-30, 49, and 55.

given a century before Hunter's time by Thomas Sydenham (1683). In the eighteenth century the symptoms of gout were well recognized, but many other, quite unconnected, conditions were also regarded as being manifestations of this disease, so that every such diagnosis has to be closely examined before being accepted. Even as late as 1896 Ewart regarded as gouty a number of conditions now thought to have no direct connexion with the disease. It is interesting to note that he laid stress on the occurrence in gout of atheroma, a lesion which he regarded as secondary to "gouty" granular kidneys. A masterly treatise on the subject of gout was written by Garrod (3d ed., 1876).

Home does not give many details in this regard, but it seems likely that Hunter in fact suffered from gout, although this played only a minor part in the symptoms from which he suffered and was apparently mild in form. The supposition that he suffered from gout is based on two facts—firstly, the regularity of the attacks in the spring in four successive years (1769-72) is very suggestive of gout, and secondly, in the other attack mentioned, in 1785, although rather late in the spring, we are told of the characteristic swollen, red, painful great toes. There was possibly a sixth attack of a similar nature in 1790, when he had transient pain and inflammation of one great toe. The first attack which is mentioned was in 1769, when John Hunter was forty-one years of age. This is a typical age for the onset of gout, but it has to be remembered that it was during this period that he was conducting upon himself the experiment with syphilis. Occasionally a painful arthritis may occur in the secondary stage of syphilis, and in the tertiary stage, and sometimes in the secondary, periostitis and osteocopic pains might give rise to somewhat similar symptoms.

In the absence of further details about the attacks it would perhaps be unwise to affirm too definitely the existence of gout, but on the whole the evidence that we have is suggestive of the presence of a mild form of this disease. This is especially so since the first attack in 1769 is described as "a regular fit of the gout," affections differing from classical (or "regular") gout which were thought to be of gouty origin being usually referred to as "irregular" gout, or characterized by such adjectives as "atonic," "retrocedent," "misplaced," etc.

In the European spring of 1773 Hunter had a coronary occlusive attack. There was intense pain in the epigastrium ("about the pylorus") unrelieved by thirty drops of laudanum, with a desire

to move about, which lasted three-quarters of an hour and then slowly went off over the next hour or two. In addition there was dyspnoea and shock, but no loss of consciousness.

Ryle (1928) appears to have been the first to point out that this attack was of the nature of an occlusive episode, the syndrome of coronary occlusion having then only recently been clearly differentiated from angina pectoris. Joseph Adams, however, as early as 1817 had recognized that this seizure was of cardiac origin and not an affection of the stomach as thought by Hunter (Ryle, 1928).

It is interesting to note that this cardiac attack was regarded by Ottley (1837) as probably having a "gouty" basis, since Hunter this year did not have an attack of "regular" gout as he had had in previous springs; and Hunter's wife, Anne, in writing to Jenner in September, 1785, about the pain he had suffered in that year as a result of his coronary disease alluded to his condition by saying that he had been "tormented with a flying gout."

After this attack he was well for four years, and then towards the end of the spring of 1777 he had a most bizarre illness which cannot be accounted for as being caused by his coronary affection. The details of this must be considered more fully in a moment.

The beginnings of his angina pectoris date from April, 1785. His symptoms were of gradual onset over a few weeks, beginning as vague uncomfortable feelings in the head and neck and left arm, then a feeling of constriction of the chest and finally pain in the chest. A feature of these attacks was that they were always accompanied by a raw, sore feeling in the throat. A less constant feature was a sensation in the left hypochondrium and eructations, and also sometimes hiccough.

About the end of April of this year he again had a coronary occlusive episode, in which he lost consciousness for about ten minutes and was delirious for a few days, and after recovering from this he had a third occlusive attack towards the end of May, in which he had violent pain for two hours. A few days later, we are told, he developed gout.

For the next eight years no attacks of a definitely occlusive nature are described, but it seems likely that he had further occlusive episodes in 1790, 1791, and 1792, before his fatal attack on 16 October 1793. During this period he had many attacks of angina pectoris. The pain was typical of angina of effort, being more easily brought on after a hearty meal. He thought that drinking wine made the attacks worse, so he gave this up. For a while his condi-

tion seems to have improved, a greater amount of exercise being required to bring on the pain, then slowly but steadily it became worse.

The attacks were brought on by physical effort or by the emotions of anxiety or anger. The importance of the rôle played by emotion as opposed to physical effort in bringing on his attacks has sometimes received emphasis, but this probably depended upon the fact that he learned to control the amount of effort so as at first to avoid and later to minimize seizures, whereas he was quite unable to control his emotions, being in his later years very easily roused to anger, although he knew that this would bring on an attack. The attacks, we are told, did not increase in violence, but were more frequent and brought on by less and less effort, so much so that for about the last three years of his life even the act of undressing brought on an attack, and sometimes he would be woken from his sleep by pain—angina at rest.

There remains to be considered the bizarre illness that John Hunter had in 1777, ten years after the primary syphilitic sore, at the age of forty-nine, and the similar episode twelve and a half years later in December, 1789.

The first attack was ushered in by vague feelings in the abdomen. As soon as he got into bed he felt as if suspended in air, and the room seemed to go round for some time; he then vomited, and had a good night's rest. The next day he had a similar attack of giddiness and had to lie down flat. The attack became worse and he had the illusion of feeling only two feet high. There does not appear to have been any paralysis, but any movement of the limbs seemed to him to cover a great distance and any movement of the head gave a very distressing sensation of rapid motion. Thus he lay, scarcely stirring, for ten days, during this time having to be fed. All the special senses were unusually acute, and there was intense photophobia. The pulse, we are told, was about 60 per minute and weak, and the skin rather hot, especially of the hands and feet. He gradually recovered from this illness over several weeks, making a complete recovery, but when he first tried to walk, his proprioceptive sensations were evidently deficient, and for a time he had a certain amount of red vision, the fire appearing a deep purple red.

Then in 1789 he had a sudden attack of amnesia which lasted about half an hour, without any loss of consciousness or sensory or motor disturbance.

Two weeks after this there came on a similar bizarre affection to that of 1777. There was giddiness, nausea, and vomiting, and the attack gradually developed over the course of a few hours. There was apparently no paralysis, but perhaps loss of proprioception. This time he felt four feet high, objects seemed far away and leaned to the left, there was photophobia and yellow vision. Hearing was more acute than normal and there was a slight drumming of the pulse in the left ear. Any movement of the head was very disagreeable to him. His mind was perfectly clear. In the early stages of the attack he had acute retention of urine, but this passed off. From this attack, which lasted about a week, he never recovered completely. He was able to get about after a few weeks, but objects always retained an oblique appearance and his memory was in some respects impaired.[3]

About all that can be said with certainty about these attacks is that they were of cerebral origin.[4]

The sudden, gross, transient amnesia is highly reminiscent of hypertensive encephalopathy, and high blood pressure might have been the cause of this attack, but could not explain the other two illnesses. The small size of the heart, however, is against the possibility of hypertension.

These attacks were of the nature of acute illnesses with gradual recovery over a few weeks, and were not associated with obvious gross lesions of the brain or meninges. Clinically, they are atypical, but their very bizarre nature is in favour of a syphilitic rather than a non-syphilitic aetiology, and the recurrence of a similar bizarre episode after the lapse of more than twelve years suggests an infection that has persisted remarkably in a quiescent state.

The exact site of the lesions in the nervous system it is difficult to be sure about, but the course of the illness, it is suggested, was as follows. In 1777, ten years after the primary sore, there was an attack of acute syphilitic encephalitis. This gradually subsided. Twelve years later this flared up again in much the same sites. The acute attack this time was milder, but it left behind some impair-

[3] Stevenson (1952) has presented a letter written by Hunter to his friend Edward Jenner in January, 1793, that shows definite evidence of this mental deterioration.

[4] Brain (1952) has suggested that these bizarre symptoms could be explained by a lesion of the parieto-occipital region. His postulation of sensory epilepsy for the attacks that began in 1785, however, does not seem to be necessary, as these symptoms coincided with the first onset of Hunter's attacks of angina pectoris and can be explained as being part of the syndrome of this condition, since the sensory effects of cardiac lesions need not be confined to pain, and sensation from such a lesion may be referred to the head and neck, especially on the left side, as in Hunter's case. The syncopal attack mentioned by Brain seems to have been caused by a coronary occlusion. In this paper he has commented in passing on the atheromatous nature of the coronary vascular disease.

ment of memory and vision because of the gradual quiet progress of the chronic infection in the intervening years. This had been manifested only by increased irritability and lessened control of his temper, his intellect not being impaired. Fortunately, probably, for his reputation as a scientist he was killed by a non-syphilitic disease of his coronary arteries before the onset of the dementia of general paralysis of the insane.

The evidence is clear-cut that John Hunter's cardiac pain and eventual death were caused by atheroma and not by syphilis, but there is strong presumptive evidence that the late result of his self-inoculation with "the venereal poison" was that the *Treponema pallidum* lodged in the central nervous system. Who can deny him the name of martyr in the cause of medicine? For his lack of emotional control cost him much intense pain and was a factor in precipitating the attack in which he died, at a board meeting at St. George's Hospital, London, in the autumn of the year 1793, on the same day, and perhaps the same hour as, on the other side of the Channel, Marie Antoinette was paying the price of royalty at the hand of La Guillotine.

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Some Medieval Medical Manuscripts at the Vatican

LYNN THORNDIKE*

1. THE printing of adequate catalogues of the many collections of manuscripts at the Vatican is proceeding at such a slow pace that it may be useful to historians of medicine and students of medieval Latin manuscripts to supplement my paper of 1929, entitled, "Vatican Latin Manuscripts in the History of Science and Medicine,"[1] which was based in large part upon the old catalogues and inventories in long-hand in the Sala di Studio at the Vatican, by an account of some medical manuscripts of the later medieval centuries which I examined in the spring of 1951. The present article is limited to a few manuscripts of a single collection, Vatican Latin manuscripts. The Palatine collection was dealt with to some extent in two articles entitled, "Little Known Names of Medical Men in Vatican Palatine Manuscripts"[2] and "Unfamiliar Medical Works by Known and Anonymous Authors in Vatican Palatine Manuscripts."[3] In order to facilitate reference, this article is divided into numbered paragraphs, and at its close indices based on these are given for names and subjects, manuscripts, and incipits, tituli, and utrum's.

2. Two manuscripts consist in large part of works by Dino del Garbo, who died in 1327, and his son, Tommaso del Garbo, one of Petrarch's correspondents. In these manuscripts, however, Dino is usually called simply Dinus de Florentia without mention of a family name. Vatican Latin 2484 is a paper folio of the fourteenth century with large writing in double columns. The works of Tommaso, however, are in a smaller hand than those of Dino. The manuscript at present has 238 leaves, but there are signature words on the last page for the next quire, which is now lacking and may have been followed by yet others.

The bulk of the present manuscript, or first 182 leaves, is taken up by Dino's commentary or Questions upon the fourth Fen of the first book of the *Canon* of Avicenna. The prologue, found in

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1 Published in *Isis*, 1929, *13*, 53-102.

2 *Ann. med. Hist.*, 1936, *n.s. 8*, 145-59.

3 *Ibid.*, 297-305.

the printed editions,[4] seems to be missing, and the manuscript opens with the first words of the fourth Fen, "Dicemus quod res . . . ,"[5] and of Dino's commentary, "Superius determinat Avicenna de rebus que spectant ad partem theorice. . . ."[6] At its close the present copy is dated November 15, 1329.[7] There follows a Table of the questions or *Utrum's,* two hundred and twenty-seven in number, which have been discussed by Dino[8] in the foregoing work.

3. After several blank leaves comes the *De reductione medicinarum ad actum* of Tommaso del Garbo of Florence,[9] with the same incipit[10] as in the edition of Venice, 1506.[11] This edition does not include a second question as to degrees which occurs in the manuscript,[12] although at the start it promises to do so.[13] In consequence, the printed and manuscript texts end quite differently. The former concludes with the first question, saying that it omits for the sake of brevity much which might be said further,[14] while in our manuscript Tommaso states that he has written "of this matter" in a great *Summa* which he is engaged in composing on all the works of Hippocrates[15] and therefore will not pursue it

4 Opening, "Considerans verbum Galieni septimo terrapeutice methodi . . ." See Lynn Thorndike and Pearl Kibre, *A catalogue of incipits of medieval scientific writings in Latin,* 1937, col. 712, item 4. This work will henceforth be cited as TK.

5 More fully, as in edition of Basel, 1556, p. 152: "Dicemus quod res medicationis ex una trium rerum . . ."

6 TK has the variant form, "Supra Avicenna determinavit de rebus . . . ," which continues, "que spectant ad partem theorice medicine. . . ."

7 Fol. 182vb, "Et completa est hoc opus anno Christi MCCCXXVIIII mensis Novembris die XVa. Explicit dilucidarium totius practice artis medicinalis editum a Dyno de Florentia medicine doctore, deo gratias."

8 At fols. 183r-184v, "Tabula questionum que moventur supra 4a fen Primi per Dynum medicum dilucidatorem."

9 At fols. 189ra-193rb.

10 "Quoniam nil carius ac utilius existit . . ."; TK 599.

11 Thome de Garbo Florentini doctoris preclarissimi summa medicinalis . . . etc. fols. 117vb-119vb: "Explicit tractatus magistri Thome de garbo de reductione medicinarum ad actum. Deo sit laus. Venetiis mandato et expensis heredum Nobilis viri domini Octauiani Scoti civis Modoetiensis. Anno salutis sexto et quingentesimo supra millesimum. Sexto kalendas Septembres. Per Bonetum Locatellum presbyterum Bergomensem." I own a copy of this edition.

12 Vatic. lat. 2484, fol. 191rb (near the bottom of the column): "In quesito de gradibus quod erat secundum investigabile, qualiter in comparatione ad quid (?) medicine reponantur in gradibus."

13 Ed. of 1506, fol. 117vb (near top of column): "Et prima investigatio erit de reductione medicinarum ad actum. Secunda erit qualiter etiam et in comparatione ad quid medicine in diversis gradibus reponantur."

14 *Ibid.,* fol. 119vb: "Et hoc est quod nobis apparet dicendum in hoc quesito primo. Et licet adhuc multa essent excutienda que aliis gratia brevitatis obmittimus dantes eis causam vel viam ulterius investigandi."

15 The *Summa medicinalis* which occupies fols. 1ra-115vb in the edition of Venice, 1506, does not answer very well to this description, and in any case is incomplete, giving only the first book, four tractates out of six in the second book, and none of its proposed third book.

further here.[16] He adds that he composed the present work or *Summula* in the third year of his lectures as ordinary professor in August, 1351, while the army of the archbishop of Milan lay before the city of Florence.[17]

4. The treatise of Tommaso, *De restauratione humidi radicalis,* follows his *De reductione medicinarum ad actum* in our manuscript,[18] whereas it precedes it in the edition of 1506.[19] The incipit is the same in both,[20] but at the close the manuscript has a statement, not found in the edition, to the effect that Tommaso composed it in his second year of lecturing at Bologna, but without naming the year. It was, however, presumably before the lectures at Florence of 1349-1351, mentioned above, since at the close of another work, composed in honor of and for the utility of the University of Bologna, Tommaso gives the date as February 27, 1345.[21]

16 Vatic. lat. 2484, fol. 193rb: ". . . sed de hac materia iam scripsimus in summa magna quam actualiter componimus disputative super omnes libros Ypocratis, ideo circa hoc privatam speculationem prodimisimus."

17 *Idem:* "Et ego Thomas olim Dini famosi medici de Garbo de Florentia hanc summulam composui in tertio anno nostre lecture ordinarie Florentie 1351 de mense Augusti in diebus in quibus exercitus archepiscopi Mediolan. fuit circa civitatem Florentinam. Explicit summula de reductione medicinarum ad actum et gradibus in eis repertis (?) per magistrum Thomam de Garbo de Florentia."

18 *Ibid.,* fols. 193rb-195va.

19 Ed. 1506, fols. 116ra-117va.

20 "Tractatum intendimus edere utilem . . ."

21 Libri de differentiis febrium a Galeno editi tres translationes, vz. Antiqua, Leoniceni et Laurentiani, breviter ac faciliter expositi et digressionibus scientificis Thadei, Dyni et Thome de Garbo, illustrati a Rustico Placentino . . . , Papiae, 1519, in-8. At fol. 126va, the *Digressiones* of Tommaso del Garbo, some 69 in number, open: "Incipiunt digressiones. Sed licet nos transgressionem facere . . ." and close at fol. 224rb: ". . . MCCCxlv die xxvii Februarii quod ego Thomas olim Dini famosi medici de Garbo iuxta minimam meam facultatem composui in honorem et utilitatem Bononiensis universitatis et omnium in scientia medicine laborantium."

Copy used at New York Academy of Medicine. Other editions of Tommaso's commentary on *De differentiis febrium* are listed of Lyons, 1514 (TK 274, "Galienus vir mirande . . .") and Venice, 1521 (TK 358, "Intendimus commentare . . ."), but I do not know if they contain the *Digressiones.* These other editions do not seem to be available on this continent.

"Dynus" and "Contra Dynum" are frequent marginal heads, but I saw no reference to Thadeus, although he is named in the title. Conciliator (i.e., Peter of Abano) is cited more than once, as are yet more recent writers, such as Antonius de Parma, whom we shall have further occasion to mention, and Gentile da Foligno and "Trusianus" or "Plusquam commentum" who were both still living in 1345, when Gentile produced a number of medical works (see my *A history of magic and experimental science,* III, 234-36). He died in 1348, perhaps from the plague, and Turisanus de Turisanis or Pietro Torrigiano de' Torrigiani, author of *Plusquam commentum,* about 1350. (See my *Science and thought in the fifteenth century,* 1929, p. 118, n.27.)

Apparently the diverse views of contemporaries in the same field of knowledge and on the same special topic became known rapidly at this time and were communicated not merely orally in lecture and disputation, but by writing. No doubt the transfer of professors as well as students from one university to another, as in the case of Tommaso from Bologna to Florence, and in that of his father, Dino, from Bologna to Siena, facilitated this.

5. Next comes a question which is anonymous in our manuscript and which the unnamed author says is the first question of his *Quodlibeta* and the only one that he has composed thus far.[22] It is followed by a much longer disputation by Dino of Florence on the Galenic subject, *De malitia complexionis diverse,* a disputation which he is said to have held at Siena in 1327, the last year of his life.[23] A brief question by Gentile da Foligno whether natural heat and fever can co-exist in the same subject[24] succeeds this and is in turn followed by another short question of Tommaso del Garbo relating to the eighth month's child.[25] None of these four questions seems to have been printed or known before, unless possibly as a part of some longer work.

6. The same is true of the remaining six items in our manuscript. The first, which opens with a quotation from Mesue, is said at its close to be by Tommaso, the oldest son of Dino, the famous physician of Florence, "in the first year of my lecturing at Florence,"[26] which would be 1349. The next item, in a hand like that of the long introductory commentary of Dino, is also ascribed to him at its close.[27] After an anonymous question whether *variole et morbilli* are generated from superfluous menstrual blood,[28] we have, in a smaller hand again, an anonymous commentary on the second Fen of the fourth book of the *Canon* of Avicenna.[29] A question whether the herb *mellilotum* is hot is attributed to Gentile

22 Vatic. lat. 2484, fols. 195va-196va: "Fuit prima questio quodlibet nostri, de quo quodlibet non scripsi nisi hanc questionem, Utrum sanitas membri consimilis que est sibi propria sit idem quam sua bona complexio. . . ." Neither "Fuit prima . . ." nor "Utrum sanitas membri . . ." occurs in TK.

23 *Ibid.,* fols. 196va-210ra: "Quia intentio nostra est edere tractatum quoddam de malitia complexionis diverse . . . / . . . Explicit tractatus de malitia complexionis diverse disputata per Dinum de Florentia medicine doctorem M.CCC.XXVII in civitate Senarum." Incipit not in TK.

24 *Ibid.,* fols. 210ra-211ra: "Queritur utrum calor naturalis et preter naturam que est febris sint in eodem subiecto . . . / . . . Explicit questio Gentilis de Fulgenio." Incipit not in TK.

25 *Ibid.,* fols. 211ra-212ra: "Dubitatur an fetus in octavo mense sit vitalis vel vivens . . . / . . . Explicit questio magistri Thome de Garbo de Florentia doctoris medicine, Utrum natus in nono (*sic*) mense sit vitalis et quomodo vivit (?) in 7 et 9 . . ." Incipit not in TK.

26 *Ibid.,* fols. 212rb-214rb: "Verbum cecidit inter querentes scire quid est: hec verba scribit Iohannes Mesue in prologo sui libri de consolatione medicinarum." They are its incipit; see TK col. 769. "In omnibus rebus et habitudinibus que incipiuntur equissimum et dignum est laudare deum . . ." This incipit is not in TK. ". . . Ego Tomas aini (?) Dini medici famosi de Florentia feci primo anno mee lecture Florencie, deo gratias."

27 *Ibid.,* fols. 214rb-217rb: "Queritur utrum supposito quod corpus frigidum, sive sit frigidum ex etate . . . / . . . Et hec quidem est sufficientia ad veritatem in hac questione. Dynus de Florentia." The incipit is not in TK.

28 *Ibid.,* fol. 217rb, "Queritur utrum variole et morbilli generantur ex sanguine menstruo superfluo . . ." The question ends or breaks off at the bottom of 217va. Fols. 217 vb-218vb are left blank. The incipit is not in TK.

29 *Ibid.,* fols. 219ra-237rb: "Avicenna in precendi (*meaning,* precedenti) fen determinavit de febribus. In hac fen determinat de crisi . . . / . . . Expleta est fen 2a 4ti can. Avic." Incipit not in TK.

da Foligno,[30] while the last item is again concerned with the eighth month's child.[31]

* * * * *

7. Vatican Latin 4464 is a membrane folio of the fourteenth century of 142 leaves, written in double columns with about sixty lines per column. In the margin above the first column is the following legend: "Tadeus super libro Tecni et de malitia complexionis Galeni et super de natura foetus et quedam in Aphorism." In the text itself, however, both the commentary on the *De malitia complexionis diverse* of Galen and that on the *De natura foetus* of Hippocrates are attributed to Dino of Florence. The former, however, differs from the Disputation of Siena, 1327, and is said to have been made by Dino with his own hands when he was at Bologna.[32] The other is stated to have been taken down under Dino by master Julian de Prehuntis of Bologna and is dated October 10, 1310, and I should say that the handwriting may be of that date.[33] This work was printed at Venice in 1502 in a collection of tracts of which we shall treat later.

8. This Julian de Prehuntis of 1310 is perhaps the same as a Julian de Proamptis, who in another Vatican manuscript wrote the close of a speech in honor of medicine at the opening of the university in 1342,[34] since he is also called *Pronatensis*.[35] At any rate, in this other manuscript, too, are several questions by a master Julian of Bologna: whether appetite is possible when the body is replete, whether the most fitting medicament for the

30 *Ibid.*, fols. 237va-238rb: opening, "Utrum mellilotum sit calidum in primis . . ." Not in TK.

31 *Ibid.*, fol. 238rb-vb, opening, "Anticipans natus vel partus decem diebus a nono mense completo . . ." Also not in TK.

32 Vatic. lat. 4464, fols. 74ra-86vb: "Malitia complexionis diverse etc.," opening, "Ut videamus aliqualiter necessitatem eorum que in hoc libro sunt tradita . . . ," and closing, "Explicit scriptum de malitia complexionis diverse per M. Dinum de Florentia factum manibus propriis quando erat Bononie et est totum tassatum ii quart' stacasis —— col." Fols. 86vb and 87r-v are left blank. Puccinotti, *Storia della medicina*, II, i, cvii-cxii, printed only a brief extract from it from this MS. and gave the fols. covered by it erroneously as 74-82.

33 *Ibid.*, fols. 88ra-123ra. After the catchwords of the Hippocratic text, "Si sperma ab utrisque permansit in matrice etc.," the commentary opens, "Sicut scribitur a philosopho in principio quarti polliticorum . . ." At fol. 116va, after the words, ". . . ne animalia ipsam abhorrerent," the lower half of the column is left blank, but the commentary seems to resume in the next column. At fol. 123ra, "Expliciunt recollectiones super libro de natura fetus Ypocratis Reportate sub excellentissimo artium doctorē et scientie medicine magistro Dino de Florentia per magistrum Iulianum Bononiensem de Prehuntis sub anno domini 1310 die 10 mensis Octobris qui sit benedictus."

34 Vatic. lat. 2418, fol. 227ra-b: "Dicta a magistro Iuliano de proāptis ad honorem medicine in principio studii anno domini M° CCC° xlii° scilicet sermo et quedam questio." I treated of it in "The Debate for Precedence between Medicine and Law," *Romanic Rev.*, 1936, *28*, 185-86.

35 In the preliminary table of contents and the written catalogue a contracted form of the name has probably been variously rendered by different copyists.

wounded should be cold or hot, and whether poison can sometimes nourish a body to which it is said to be poison.[36] To master Julian of Bologna is further ascribed a *Quodlibetum* under which are several questions.[37]

9. The first treatise in Latin MS 4464, a commentary on the *Tegni* of Galen, was printed as the work of Taddeo Alderotti of Florence (1223-1295) in 1522,[38] and this manuscript of it has been noted by Puccinotti in his History of Medicine.[39] The concluding component of our manuscript, a commentary upon the Aphorisms of Hippocrates which in the preliminary legend was ascribed to Taddeo but in the text is anonymous, is in a smaller hand, like the commentary on the *Tegni* of Galen and unlike the larger writing of the two works by Dino, and opens with an interesting reference to the Greek translation.[40]

* * * * *

10. The aforesaid commentary by Dino on *De malitia complexionis diverse,* opening, "Ut videamus aliqualiter necessitatem eorum que in libro sunt tradita . . . ," occurs again anonymously in another fourteenth century manuscript at the Vatican[41] where, moreover, it is soon followed by a *Quodlibet* and another question

[36] I have not seen the MS since 1931 and follow a preliminary table of contents at fols. 3r-8r, of which I have a reproduction.

Vatic. lat. 2418, fol. 172v, "Magistri Iuliani Bononiens.quaestio Utrum corpora ultimate repleta debeant posse appetere cibum"; fol. 177r, "Magistri Iuliani Bononiens. quaestio, Utrum medicamen conveniens verius et maxime verius vulneratis debeat esse frigidum vel calidum"; fol. 192r, "Magistri Iuliani quaestio Utrum venenum aliquando possit nutrire corpus respectu cuius dicitur esse venenum."

[37] *Ibid.,* fol. 222v, "Utrum ab alio humore quam a sanguine possit fieri febris inflegmata absque putredine"; 223r, "Utrum accidentia anime sint res naturales vel non"; "Utrum lac possit coagulari urina"; "Utrum fortitudo virtutis insequatur temperamentum complexionis"; "Utrum cibus grossior sit mutabilior subtili"; "Utrum medicina solutiva debeat dari stomaco vacuo a cibo"; fol. 223v, "Utrum febris pestilentialis sit febris facta vel fiens"; "Utrum in cura catarri competat acetum vel syruppus acetosus"; "Utrum in cura antracis competat somnus."

[38] Taddeo, *In librum tecni Galeni commentaria,* Napoli, 1522.

[39] Francesco Puccinotti, *Storia della medicina,* Livorno, II, i (1855), pp. xxxiii-xxxiv, xxxvii. He was in error in representing the work as extending to fol. 76, since it ends at fol. 71rb, while he himself (*Ibid.,* pp. cvii-cxii) gave fol. 74 for the opening of the commentary on *De malitia complexionis diverse.* His unreliability as to pagination is further demonstrated in his placing at fol. 77, "Explicit liber de signis. Incipit liber de causis," whereas actually these words occur at fol. 39ra. The space between fol. 71rb and 74ra is occupied by a tract opening, "Sacre autem existentes res sacris hominibus confiduntur . . ." which I judged was not medical and did not examine further.

[40] Vatic. lat. 4464, fols. 125ra-142ra: first the catch-words of the text, "Vita brevis, ars vero longa"; then the incipit of the commentary, "Hoc verbum est sexti initio huius Af. secundum translationem grecam . . ."

Puccinotti noted the occurrence in Vatic. lat. 4454, fols. 50-52v, of a commentary by Dino on two Aphorisms of Hippocrates, namely, II, 24, "Septimae quarta est indicativa"; and I, 12, "Paroxismos vero et consistentias declarant egritudines et tempora anni ect." and at II, i, xc-cvi, printed a portion of the latter, but, as usual, gave no incipit for the work as a whole.

[41] Vatic. lat. 4452, membrane, early 14th century, fols. 133ra-142rb, where it ends or breaks off, the lower half of the column being left blank.

debated by a Master Julian of Bologna,[42] who is presumably the one who took down Dino's *Recollectiones* on the *De natura foetus* of Hippocrates on October 10, 1310.

11. Yet another manuscript opens with the commentary of Dino upon Galen's *De differentiis febrium*. The incipit of this commentary refers to Galen's *De accidenti et morbo* and *De malitia complexionis diverse* in a way to suggest that Dino may have commented upon the former as well as the latter.[43] And later in this same manuscript are *Recollectiones* on *De accidenti et morbo* "secundum M (?) "[44] as well as Questions on the same work by Anthony of Parma.[45] The leaves between these commentaries on *De accidenti et morbo* and that of Dino on *De differentiis febrium,* which opened the volume, are occupied by the well-known commentary of Jean de Saint Amand of the thirteenth century upon the *Antidotarium Nicolai*.[46] The manuscript closes with a brief tract with the unfamiliar incipit, "Avicenna primo canonis fen prima ca. de subiectis medicine dicit. . . ."[47]

12. Coming back to the other manuscript, Vatican Latin 4452, in which we have thus far noted only writings of Dino del Garbo and Julian of Bologna, we find it is initiated by *Recollectiones* on the first Fen of the first book of the *Canon* of Avicenna by the Anthony of Parma who has been already mentioned.[48] This Anthony, according to Tommaso del Garbo in his printed *Summa,* held the view that vision was effected in the heart.[49] Among the questions discussed by him in the present work are: to what extent certain knowledge can be had in medicine, what its subject is,

42 *Ibid.*, fol. 146ra, margin, "Incipit quolibet disputatum in universitate a magistro Iuliano Bonon." The text opens, "Quoniam ordo in rebus scibilibus est causa facilioris apprehensionis. . . ." At fol. 148ra it ends and the other question by him opens, "Questio disputata fuit utrum medicine conveniens verius . . ." Or possibly the contractions are for *materie continens* rather than *medicine conveniens*. At fol. 149rb it and the entire MS end.

43 Vatic. lat. 4450, membrane, 14th century, double columns, 68 lines to a column, fols. 1ra-21va: "Differentie febrium etc. Postquam G. in libro de accidenti et morbo determinavit de egritudine in generali et in libro de malitia complexionis diverse . . . / . . . Explicit recollectio de differentiis febrium magistri Dini."

44 *Ibid.*, fols. 57ra-72vb: "Recolitiones (*sic*) super libro de accidenti et morbo secundum M (?)," opening, "In principio huius libri sicut in principiis aliorum nos oportet inquirere quatuor causas . . ." Not in TK.

45 *Ibid.*, fols. 73ra-93rb: "Questiones super librum de accidenti et morbo per magistrum Antonium de Parma," opening, "Queritur primo de subiecto libri sed hec est disputata in lectura textus . . ." Not in TK.

46 *Ibid.*, fols. 21va-55va, with a table of contents of the 98 chapters at fols. 55vb-56va.

47 *Ibid.*, fol. 95ra-va.

48 Vatic. lat. 4452, fols. 1ra-47vb: "In primis deo gratias. Intentio Avicenne in hoc libro est docere subvenire et amministrare nature . . . / . . . Expliciunt recollectiones super primam fen primi canonis Avicenne recollecte sub magistro Anthonio de Parma viro in naturali philosophia et medicali scientia elegantissime approbato (rather than "elegantissimo, approbatae," as in Affò, *Memorie degli scrittori e letterati Parmigiani*, 1789, II, 38-39) per me Albertum Bononiensem. In quibus, si defectus vel superhabundancia reperitur, mihi penitus imputetur."

49 *Op. cit.*, ed. of 1506, I, v, 18, qy. 66, fol. 65vb.

whether there is a mean and neutral disposition between health and sickness, whether the humors are the efficient or material cause of health and sickness, what human complexion approaches most closely to equality, whether it is possible to have two or more judgments in one and the same question, which age is more temperate, childhood or youth. Also whether the stomach is nourished by chyle, whether digestion occurs in the veins, whether veins originate from the liver and nerves from the brain or from other members. Whether there is in the body any member which only gives forth and receives from no other, and if so, whether it is the heart or some other member. Anthony decides in favor of the heart and maintains that the virtues of the soul are first received there. He grants that there is sensible and motive virtue in the brain, but regards the heart rather than the liver as the principle of natural virtue. Affò said that Anthony criticized the thirteenth century astronomer, Campanus of Novara, and the schoolman, Peter of Auvergne, of the same century,[50] but I did not happen upon these passages in a rapid survey of the work. Apparently Anthony flourished at the close of the thirteenth or early in the fourteenth century. Affò, who was in doubt whether to identify him with Antonio Pelacani who died at Verona in 1327, or Antonio Carpesano seniore who flourished about 1330, further noted Questions on the *Ethics* of Aristotle by him in two other manuscripts at the Vatican,[51] and a *Compendium medicinae* in a manuscript at the library of Santa Maria del Popolo, Rome.[52] But the opening words are those of a work more often attributed to John of Parma[53] or sometimes to Bernard Gordon.[54]

13. The next treatise in Vatican Latin 4452 is a commentary on *De generatione et corruptione,* with an incipit which is not very distinctive[55] but similar to that of a work by Siger of Brabant.[56]

[50] Affò, same citation as in note 48.

[51] Vatic. lat. 2172, membrane, 14th century, in-fol., fols. 1ra-53rb; also in 2173.

[52] It was on paper. In the Bibl. Angelica of Rome in MS 562 (F.3.14), a paper folio of the late 15th century, fols. 68-69, it is again ascribed to Antonius of Parma: titulus, "In Medicina Compendium magistri Ant. de Parma," incipit, "Quoniam de melioribus amicis . . ."

[53] TK 602, "Quoniam quidam de melioribus amicis . . ."

[54] TK 590, "Quoniam de melioribus amicis . . ."

[55] Vatic. lat. 4452, fols. 49ra-58va: "De generatione autem et corruptione etc. Circa istum librum queratur primo utrum de generabilibus et corruptibilibus possit esse scientia . . . / . . . ut visum est in questione precedenti. Ideo ratio non valet. Opere finito sit laus et gloria Christo. — super libro de generatione."

[56] TK col. 751: "Utrum de generabilibus et corruptibilibus possit esse scientia . . . Siger de Brabant, *Questiones: Les philosophes Belges,* 1931, XII, 268-91." See also MS Basel F.V.10, in the closing portion in better and larger writing, where a new numbering, fol. 79ra *et seq.* succeeds a previous fol. 102vb: "Tractatus circa primum librum de generatione. Utrum de generabilibus et corruptilibus potest *(sic)* esse scientia . . ." But such a question would be likely to be the first in any commentary on *De generatione.*

There follows a commentary upon *Liber de farmaciis* by the same Albert of Bologna[57] who wrote out the *Recollectiones* of Anthony of Parma at the beginning of the manuscript.[58] Then come *Quodlibeta* by the same Albert,[59] and yet another commentary on *De accidenti et morbo,* this time by Bartholomaeus de Varignana, who died at Genoa in 1318-1319. This copy of it may have been made by the same Albert of Bologna.[60] According to Puccinotti, there are also unpublished questions by Bartholomaeus de Varignana in Vatican Latin 4454, a manuscript which I have not seen, at fols. 107-115.[61]

14. A commentary upon *Liber de interioribus,* presumably Galen's work of that title, first quotes from the text, "Medicina est philosophia corporis . . . ,"[62] which, however, is not the usual incipit of the Galenic treatise.[63] The commentary, which opens, "Exordium sume a deo in agendo que agis. Verba secundum proposita scribit Sistus Pitagoras in libro qui vocatur et intitulatur Anulus . . . ," either ends without a colophon or breaks off unfinished at fol. 102rb, after which blank leaves follow through fol. 108v, while at fol. 109ra a new and larger handwriting begins and we find ourselves in the midst of another commentary, upon *De differentiis febrium.*[64] It is followed by yet another commentary, which is on *Liber de virtutibus naturalibus* and is written in a smaller hand again.[65] These three commentaries on as many works of Galen are all anonymous in our manuscript, and so in

57 Vatic. lat. 4452, fols. 59ra-61va: "Expositiones super libro de farmacis edite a magistro Alberto," opening, "Superfluitatum quidem . . . verba proposita scribit Avicenna primi canonis fen 3a . . . / . . . Expliciunt expositiones super lib. V. de farmatiis edite a magistro Alberto Bonon." Incipit not in TK.

58 See note 48 above.

59 Vatic. lat. 4452, fols. 61vb-66v (but the lower part of col. 64rb and all of fols. 65v-66r are left blank): "Hic incipit solvere magister Albertus . . . questiones sui Quolibet"; incipit, "Quia res qua utuntur in arte sua est duarum specierum, ut scribit G. 2° de crisi . . ." Incipit not in TK.

60 Vatic. lat. 4452, fols. 67ra-82vb: "Super libro de accidenti et morbo. In initio huius libri etc." The *Expositiones* then open, "Sicut apparet ex dictis Averois in sua aggregatione 2°, ca°, omnis ars operativa . . ." and close, ". . . Expliciunt expositiones super libro de accidenti et morbo recollecte sub probo viro magistro Bartholomeo de Vargnana (*sic*)." Incipit not in TK.

61 Puccinotti, *Storia della medicina,* II, i, cxiii-cxxix, prints only a portion of it, beginning at fol. 112, with the words, "Utrum medicina nutriat . . ."

62 *Ibid.,* fol. 83r, margin, "Lectura super libro de interioribus."

63 The usual incipit is "Medicorum non solum moderni verum (rather than *rerum,* as in TK 406) etiam antiqui. . . ." It is found in the 1490 and 1515 editions of Galen's works, as well as in many other MSS than those listed in TK. It is probably not a translation by Peter of Abano.

64 *Ibid.,* fols. 109ra-129va, beginning and ending: ". . . est dicta effimera quedam . . . / . . . Exploiunt super libro de differentiis febrium."

65 *Ibid.,* fols. 129va-131rb. In this case the catchwords are the usual incipit of the Galenic text, "Quia (*Quoniam* in other MSS) sentire quidem et moveri . . . ." while the commentary opens, "Ga. primo premittit quedam necessaria . . ." This latter incipit is not in TK.

this manuscript is the commentary of Dino del Garbo on *De malitia complexionis diverse* which follows them. But after it, and before the compositions by Julian of Bologna already noticed, are Questions by that Albert of Bologna[66] who copied the *Recollectiones* of Anthony of Parma with which the manuscript opened. Albert is found again in Julian's company in Vatican Latin 2418.[67]

* * * * *

15. Vatican Latin MS 2469 is a large double-columned paper folio with two membrane leaves at the end which are not covered in the table of contents on the flyleaf, although it is later than the text of the manuscript proper. The first 161 leaves are occupied by the Questions of Jacobus de Forlivio, or James of Forlì, or Giacomo della Torre, on the *Tegni* of Galen.[68] James, who taught at Padua and died in February, 1414, is perhaps better known for his work on the intension and remission of forms. Next comes a discussion of critical days by Amicus de Sulmona,[69] who was teaching natural philosophy at the University of Perugia in 1393,[70] and whose exposition is here said to have been concluded on the evening of April 4, 1395 in the schools of the venerable doctor of arts and medicine, Master Anthonius de Scarparia.[71] Another question by Amicus on the common topic of heat in boyhood and youth follows, dated a fortnight later and held in the same place,[72]

66 *Ibid.*, fols. 143ra-146ra: "Utrum appetitus causetur a calido vel a frigido," opening, "Tertia questio mota fuit utrum appetitus causetur a calido vel a frigido . . ." and closing, "Expliciunt questiones magistri Alberti Bonon. per eundem determinate." Incipit not in TK.

67 At fol. 191 is a *Questio* by Albert, "Utrum ex colera non putrescente sit possibile accendi febrem humoralem."

68 Vatic. lat. 2469, fols. 1ra-161rb, opening, "Utrum tantum sint 3 omnes doctrine . . ." Incipit not in TK.

69 *Ibid.*, fols. 162ra-170va, opening, "Questio est illa utrum dies quarta nunciet septimam . . ."

70 Giuseppe Ermini, *Storia della Università di Perugia*, Bologna, 1947, p. 158.

71 Vatic. lat. 2469, fol. 170va: "Et sic finitur questio fortis et pulcher et bene exposita per reverendum artium et medicine doctorem magistrum Amicum de Sulmona de diebus creticis anno domini millesimo trecentesimo 95° die quarta mensis Apprilis hora vespertina in scolis venerandi artium et medicine doctoris magistri Anthonii de Scarparia."

In "Vatican Latin manuscripts in the history of science and medicine," *Isis*, 1929, *13*, p. 58, before I had seen the MS itself in 1951, I followed the old long-hand catalogue, which in turn followed the aforesaid late fly-leaf table of contents, which mistook the old Arabic character for five for a seven, in giving the date incorrectly as 1397.

Ermini, *op. cit.*, p. 158, notes mentions of Antonio di maestro Cuccio da Scarperia in the medical school records of Perugia in 1389, 1396, and 1401. There is a work on fevers by Antonius de Scarparia in Vatic. Palat. lat. 1265 at fol. 13, and at Oxford in the Bodleian, MS Canon. Misc. 455, fol. 266v.

72 Vatic. lat. 2469, fols. 170va-177rb: "Dubitatur utrum caliditas in iuvene et puero sint equales in radice . . . / . . . Et sic est finis questionis de calore pueri et iuvenis scriptum per me Petrum de Fulgineo sub eximio artium et medicine doctore magistro Amico de Sulmona anno domini millesimo tricentesimo nonagesimoquinto die decima octava Aprilis in scolis venerandi artium et medicine magistri Anthonii de Scarparia." Here the year is written out unmistakably, but is not noted in the fly-leaf contents or long-hand catalogue. The incipit is not in TK.

and written down by a Peter of Foligno. After this come anonymous questions on books I and II of the *Tegni* of Galen.[73]

16. Going back for a moment to James of Forlì, we may note that the volume printed at Venice in 1502, which opens with his Exposition of the chapter of Avicenna on the generation of the embryo,[74] also contains Dino's[75] and Tommaso del Garbo's Exposition of the same chapter of Avicenna,[76] and furthermore Dino's *Recollectiones* on *De natura foetus* of Hippocrates.[77] This collection of tracts on one theme was edited by Bassanus or Bassianus[78] Politus, who three years later was to publish a *Questio de modalibus,* a treatise on proportions introductory to the *Calculationes* of Suiseth, together with the treatises of Bradwardine and Nicolas Oresme on proportions, those of Oresme and Blasius of Parma on latitudes of forms, *Auctor sex inconvenientium, Questio Johannis de Casali de velocitate motus alterationis,* and *Blasii de Parma de tactis corporum durorum questio.*[79]

17. In my article of 1929, "Vatican Latin Manuscripts in the History of Science and Medicine,"[80] I mentioned several works contained in Vatican Latin 4422, as described in the old catalogue written in long-hand,[81] but did not get to examine the manuscript itself until April 1951. It is a paper folio which I would date of the late fourteenth century.

The first six leaves, or, more accurately, fols. 1r-7r, are occupied by the so-called Galen, *De plantis,* of which forty-six *species* are

73 *Ibid.,* fols. 180ra-243ra, opening, "Queritur primo utrum attineat metaphysico consideratio doctrinarum. . . ." Incipit not in TK.

74 Jacopo da Forlì, *Expositio Iacobi supra capitulum de generatione embrionis:* copy at the New York Academy of Medicine, Rare Books Dept. James's *Expositio* had previously been printed separately at Pavia in 1479, Siena in 1485, and Venice in 1489: see Klebs, *Incunabula scientifica et medica,* Bruges, 1938, p. 184, No. 550; Margaret B. Stillwell, *Incunabula in American libraries,* 1940, p. 277, Nos. J39 and J40.

75 Jacopo da Forlì, *Expositio* . . . , fols. 17vb-32vb, Expositio Dini de Florentia supra capitulum de generatione embrionis cum questionibus eiusdem.

76 *Ibid.,* fols. 33ra-45rb: Tommaso del Garbo, Expositio super cap. De generatione embrionis tertii canon. fen 25e Avicen. There are only 22 Fen in the 1556 edition of the Canon. Probably Fen 21, De membris generationis in mulieribus, is meant. Indeed, it is so stated in closing: fol. 45rb, "Explicit subtilissima expositio super capitulo de generatione embrionis tertii canon. fen 21 Avic. secundum excelentissimum Thomam del Garbo . . ."

77 *Ibid.,* fols. 45va-89rb, where we read, "Hic imponit finem huic operi . . . et nos etiam imponamus finem huic scripto . . . Expliciunt recollectiones super libro Hypo. de natura fetus reportate sub excelentissimo doctore artium et scientie medicine Magistro Dino de Florentie." At fols. 89va-90ra, "Tabula super quesita totius operis."

78 Bassianus in the printed catalogue of the Bibliothèque Nationale, Paris, and on the verso of the title-page of the Venice, 1502, edition. Bassanus on both title-page and verso thereof in the 1505 *De modalibus* and in the printed catalogue of the British Museum.

79 Venetiis, 1505, in-fol. Copies used: BM 531.m.12.(2.); BN Rés.R.147 (1).

80 See note 1.

81 *Ibid.,* p. 71, notes 91 and 95; pp. 76-77, notes 27-30.

treated in numbered paragraphs. On the top margin of fol. 1r is written, "liber primus incipit Translatio et sunt experimenta probata." The text below opens, "Translator (*not* Translatio) Jacobus Alben. de arabico in latinum interpretam (*sic*) Habraam Iudeo Tortuosien. Inquid Iohannitius, Intendit Gal. in hoc libro . . ." These last words open the prologue by Hunain ibn Ishak, called in Latin Johannitius and the translator of the work from Greek to Arabic. I reproduce the Latin translation of this prologue *in toto.*

> Inquid Iohannitius, Intendit Galenus in hoc libro rememorari quod agregavit de medicinis mirabilibus in suis operationibus et proprietatibus quas expertus est multis vicibus. Et non erravit in experimentis ipsarum, nec deceptus fuit in ipsis. Et ideo fecit eas secretas et ocultavit eas multis hominibus et non manifestavit eas illis et non substimuit (*sic*) eas videri nisi paucis hominum sapientum et habentium sanum intellectum et cognitionem. Et non declaravit eas omnibus sed hiis qui sunt digni ussu (*sic*) earum et habentibus purum intellectum.
>
> ¶ Et occurrit mihi descriptio harum medicinarum et agregavi de eis illud quod est utilius, quod et ego expertus sum et probavi et curavi cum eis. Quamvis alius a me exsposuerit hunc librum et non intellexerit plurimum earum, quod est quia omittebat de eis et addebat quod non erat in eis et dimittebat de illis in expositione sua quod non erat in intellectum apud ipsum. Et quando fui requisitus et rogatus ut exponerem hunc librum, firmavi me in eo cum sollicitudine secundum hoc quod fieri potest et iusta posse meum. Et correxi ipsum cum aliis translationibus grecis que fuerunt agregati in meo posse, et transtuli ipsum de greco in harabicum Habuafer Macomet filio Moisi, et ideo sit confidencia mea. Explicit prologus Hunayn.[82]

Then is added the statement: "Narratio medicinarum occultarum et proprietatum operationum . . . cum expositione earum et sunt xv medicine." The text of *De plantis* then begins: "Prima earum, inquit Galenus, planta que nominatur halrelgenga (?) . . ." This serves to explain why *De plantis* has been identified with *De medicinis occultis.* But it is difficult to identify a treatise about

82 Said Johannitius, Galen meant to record in this book what he had collected of marvelous medicines in his operations and properties which he had tested many times. And he did not err in testing them, nor was he deceived in them. And he made a secret of them and hid them from many men and did not reveal them to them, and did not permit them to be seen except by a few who were wise and had a sane intellect and knowledge. And he did not declare them to all but to those who were worthy to use them and who had a pure mind.

And an account of these medicines came into my hands, and I selected what was more useful, and what I had tested and proved and worked cures with them. Although another person had expounded this book and had not understood much of it, which is because he made omissions and added what was not there, and set forth in his exposition what was not its meaning. When I was asked and requested to expound this book, I steeped myself in it solicitously and to the best of my ability. And I corrected it by the other Greek versions which I was able to collect, and I translated it from Greek into Arabic for Abu Afer Mahomet, son of Moses. And so I rest content. End of the prologue of Hunayn.

fifteen medicines with one about forty-six species. It would seem that the prologue of Hunain ibn Ishak belongs with another work, translated into Latin by Abraham of Tortosa and Grumerus of Piacenza, while *De plantis* was translated by Jacobus Albensis. At any rate at the close of the work in our manuscript we find the statement that it was translated at Marseilles by Iacobus Albensis the Lombard in 1282.[83]

18. This translation is followed by a number of electuaries, syrups, and pills (at fols. 7r-9r) of which the first opens: "Electuarium letitie Galeni quod describit in almaycanir et est in mense nobilitatis . . ."[84]

19. Next in our manuscript comes the so-called Secrets of Galen, addressed to a friend Monteus[85] and found in many other manuscripts.[86] It is followed by a *Receptarium* of some ninety or a hundred items,[87] and a collection of medical "Experiments."[88] Both are here anonymous, but in Latin MS 324 of Merton College, Oxford the latter is attributed to Parisius abbas and entitled *Experimenta de febribus*. In the present manuscript, however, the text soon turns to other diseases such as epilepsy, but keeps men-

[83] Vatic. lat. 4422, fol. 7r: "Translatus est liber iste Massilii a Iacobo Albensi lumbardo sub anno domini M°CC°lxxxii." This statement is preceded by Hunain's epilogue, which fits *De plantis* much better than his prologue, running as follows: "Inquit Hunain, He sunt species animalia plante gumme quas G. fecit occultas, quas exposui omnes et expertus sum et inveni veritatem in eis certam. Et ideo acquisivi honorem (*honerem* in MS) magnum per eas. Et per deum vivum creatorem celi et terre coniuro habentes sanum intellectum quod non revellent hunc librum hiis qui sunt digni eo. Et sunt eiusdem G. species cum velle dei cui sint gratie infinite." This last sentence is perhaps not by Hunain.

The incipit, "Domini creatoris celi et terre coniuro . . ." (TK 218) for a *Receptarium* by Jacobus Albensis in a Lübeck MS (med.F.4) seems derived from this epilogue and suggests that it should precede *De plantis* as its prologue. The reference in TK 218 to Wickersheimer's *Dictionnaire biographique des médecins en France au moyen âge*, 1936, p. 320, applies to a Jacques Albini, whose dates, from 1324 to 1348 or 1349, are too late to ascribe a translation of 1282 to him.

[84] Already noted in TK 233. Perhaps these constitute the "Receptarium" ascribed to Jacobus Albensis in the Lübeck MS mentioned in the previous note, in which case it would seem to have been preceded by a fragment of the above epilogue of Hunain, and perhaps, originally by *De plantis*, as in our Vatican MS.

[85] Vatic. lat. 4422, fols. 9v-22v (where it breaks off incomplete, fols. 23 and 24 being missing); fol. 9v, top margin, "Incipiunt secreta Gal." The text then opens, "Rogasti me amice Montee . . . ," not "Rogasti a me . . ." etc., as in TK 630. It is written in a large and legible, though coarse, hand. For the contents, see *A history of magic and experimental science*, II, 758-61.

[86] *Ibid.*, 775-76 lists a number. Others are Basel D.III.1, fols. 9vb-22vb; D.III.6, fols. 96ra-102v; Berne 570, fols. 6r-41r; Paris Bibliothèque Nationale 15456, fols. 157ra-163va.

[87] Ours is the only MS listed in TK 226, whose brief incipit, "Duplici medicina . . . ," taken from the written catalogue, may now be enlarged to "Duplici medicina cogente, socii dilectissimi, hoc opus instruere summo opere desudavi . . ." This opening, at fol. 25r, is soon followed by a double column table of contents of the 90 or 100 chapters. The next to the last is reached by fol. 36r, but fols. 37 and 38 are missing, and the *Receptarium* ends unfinished.

[88] Fols. 42rb-57v, opening, "Sciendum est quod ex nimia ciborum comestione . . ." which serves to identify it; see TK 645. 5.

tioning experiment. After it come Experiments of Master Thadeus[89] (i.e. Taddeo Alderotti).

20. Experiments of Thadeus also occur in a MS at the Bibliothèque Nationale, Paris, but with a different incipit. This part of the MS was written at Montpellier in May, 1301. Latin MS 6964, fols. 100ra-117ra: "Conquesta est nobis mulier de sterilitate . . . / . . . Expliciunt experimenta magistri Thadei anno ccci mense maii in Monte Pessulano .iii. pō. Sit nomen domini benedictum, Amen."

The *Experimenta* are followed at fols. 117rb-129rb, by the *Practica* of Thadeus on fevers, and after it is the following epitaph for Thadeus, who had died in 1295:

> Mille nonaginta transactis quinque ducentis
> Iove sero primo Iunii sub nocte seconda
> Migrat cunctorum Thadeus dux medicorum,
> Cuius stat musa per singula climata fusa.
> Errores stravit, tenebras ut sol radiavit,
> Oremusque dominum, Pia mater sume Thadeum.
> Amen.[90]

21. Returning to the Vatican manuscript, we next encounter what is there entitled "A Brief Compilation by John of Palma,"[91] The author is really John of Parma, though we have also seen it ascribed to Anthony of Parma, and the work is more properly entitled, *Practica ex dictis Mesue.*[92] A book on facial adornment then completes the manuscript.[93] While speaking of John of Parma we may further note two questions by him in the same manuscript with those of Albert of Bologna and Julian of Bologna. He asks

89 Fols. 57v-84v: Incipiunt experimenta infrascripta Mag' Thadei. Experimenta probata a magistro Tadeo et a quibusdam aliis doctoribus expertis in scientia medicine; fol. 58r, incipit, "Omnes herbe et radices que debent post coqui abluantur . . ."; at fol. 84v, "Expliciunt experiencie magistri T etc." In TK 460, our MS is the only one cited. It is listed by Puccinotti, *op. cit.*, II, i, xxxv, who incorrectly places *Experimenta magistri Tadei* at fol. 88, and says, "sono 26 carte da due pagine."

90 I do not have access to G. Pinto, *Taddeo da Fiorenza,* 1888, 48 pp., to find out whether he included this epitaph.

91 Vatic. lat. 4422, fol. 85r, "Compilatio brevis magistri Ioh. de Palma," opening, "Quoniam quidam de melioribus amicis quos habere videor . . ."

92 TK 602. M. A. Mehner, *Johannes von Parma und seine Practicella,* Inaug. diss. Leipzig, 1919, listed 19 MSS, all in German libraries, and used only one of them in editing the text (at pp. 14-21). Affò, *op. cit.*, II, 47-48, whose work was not used by Mehner, listed 13 MSS, including ours and five others at the Vatican.

93 Vatic. lat. 4422, fol. 89r, margin, "Incipit liber de ornatu faciei." The text opens: "Cum natura non minus indigeat aquis fisicalibus quam aliis medicinis . . . ," which is not in TK. At fol. 90v, "Sequitur de oleis. Quoniam natura non minus indiget oleis quam aquis . . . "; fol. 92r, "Post tractatum oleorum (*oculorum* in MS) breviter expediamus de omnibus syrupis . . ."; fol. 95r, "Explicit ornatus faciei deo gratias Amen."

whether cold agrees better with a feverish old man than with a youth, and whether boys are more temperate than youths, or vice versa.[94]

* * * * *

22. Vatican Latin 4440, a manuscript of the fifteenth century, is primarily a collection of medical *Consilia,* consisting of consultation and advice in particular cases. The first is by Bartholus of Siena for Pope Pius II in the year 1460.[95] The second Consilium is by Bartholomaeus de Montagnana in 1450 for a young man of Padua, Bonifacius Bucharinus, who was suffering from an immoderate attack of diarrhoea.[96] It is followed by another *Consilium* dated earlier in the same year[97] but here anonymous, as is at least one more.[98] Presently comes another which also is here anonymous, but in another manuscript is ascribed to Bartholomeus de Montagnana,[99] opening, "Ne mens mea otiosa fortassis ut credo delitiis . . ."[100] This led me to surmise that the intervening consilia might also be by Bartholomew, and I found that "Ne mens mea otiosa . . ." opened a *Consilium* attributed to him in the printed edition of 1514,[101] and that it had earlier another *Consilium* opening, "Commendatissimus adolescens Ubertinus de Marino . . ." which came later in our manuscript.[102] But I failed to find much correspondence between the other *Consilia* in the manuscript and

94 Vatic. lat. 2418, fols. 180v, 182r.

95 Vatic. lat. 4440, fols. 11ra-5va: "Dispositio itaque naturalis in habitudine totius sanctissimi domini nostri Pii secundi summi pontificis est sanguineo flemate potius participans cum epatis caliditate . . . / . . . in vita et sanitate conservare dignetur. . . . Finit consilium Bartoli Senensis art. et med. doctoris famosissimi editum pro sanctissimo domino nostro papa Pio secundo a.d. 1460."

This was more briefly noted from the catalogue in long-hand in *Isis,* 1929, *13,* 93, and TK 204. Fol. 1r is preceded by two membrane leaves from an older MS which form a front cover.

96 Vatic. lat. 4440, fols. 5vb-7vb: "Processus singularis secundum monarcham magistrum magnum Bartholomeum de Montagnana in quodam iuvene Paduano Bonifacio Bucharino 1450 19a Septembris qui patiebatur fluxum immoderatum ymmo immoderatissimum . . . / . . . dey gratia infrascriptis remediis liberatus est. Et erat eodem tempore precise alter Paduanus scholaris."

97 *Ibid.,* fol. 7vb, "Alter processus singularis in quodam qui non poterat extendere manum propter tractationem nervorum minorativum 1450 die 4a Maii . . ."

98 *Ibid.,* fol. 111ra, "Vir quidam de celeberrima urbe Viterbe (?) oriundus . . ."

99 Vendôme 228, 15th century, 228 fols. See TK 427. Apparently it there is the incipit of the entire collection of *Consilia.*

100 Vatic. lat. 4440 fol. 19va. It is subdivided into various chapters and sections and seems to end at fol. 32rb.

101 *Consilia domini Bartholomei Montagnane cum tribus tractatibus . . . ,* Venetiis per Simonem de Luere, 9 Septembris 1514, in-fol., double columns. The *Consilia* cover fols. 1-334 of the volume and number 3 and 305 (really 306 as there are two numbered 247). "Ne mens mea otiosa" is numbered 14 and begins at fol. 19vb.

102 Vatic. lat. 4440, fol. 35vb; ed. of 1514, *Consilium* 4, at fol. 7ra.

those of the printed edition.[103] If those in the manuscript are all by Bartholomew of Montagnana, they represent a different collection, or at least a quite differently arranged and briefer one than the edition. They break off at fol. 68vb in the midst of a recipe. Fol. 69 is missing, fol. 70 is blank.[104]

23. In the latter part of the manuscript we come to treatises for which authors are named. What are described in another manuscript of 1440 as Recipes for Stomach Complaints by Nicolaus de Rido[105] are here further characterized as a commentary on the 13th Fen of the third book of the Canon of Avicenna by master Nicolaus de Rado.[106]

24. Tables compiled by Petrus Marangus, a doctor of Salerno, take the form of lists of medicines, sometimes arranged in three or four columns to the page, with a statement of what each is good for and what is its degree of heat or other first quality.[107]

25. Then, in the same large, coarse hand as the preceding Tables, comes a treatise on urines which is ascribed at its close to

103 At fol. 63vb of the MS we read of ". . . hoc opusculum salutare quod ego . . . composui domino patri in Christo sancti Bernardino de religione Sancti Francisci, unico vero in etate nostra sancte religionis honestatis et devotionis speculo amplissimo . . . ," while, at fol. 250rb-va, of the edition "frater Bernardinus ordinis minorum" is spoken of as "virum dei et sacrosancte legis ferventissimum athletam deique et summe hierarchie Iesu Christi predicatorem constantissimum." Both passages undoubtedly refer to Bernardino of Siena and are equally eulogistic, but they are worded quite differently, and that in the MS seemed to have to do with bathing (*Consilia* concerning which occur in the edition only at fol. 334), opening, "Quicunque desiderat ingredi balneum . . . ," while that in the edition was concerned with diseases of the joints.

Also that of May 4, 1450 mentioned in note 97 above, which came at fol. 7vb of the MS, is something like *Consilium* 249 at fol. 264va of the edition. "Impedimentum debiti motus manus huius nobilis viri manifestum est, quoniam digitos manus saltem quatuor contrahere non potest."

104 At fol. 71ra are medical weights and measures; the rest of the page is blank. At fol. 71va is an "Oleum optimum ad lumbricos magistri Michaelis Scoti," and other oils etc. In the top margin of fol. 72r is written, *Tractatus pinularum (sic)*, but the text is not a treatise but just *Pillule* and other items. They go on with powders, unguents, confections, electuaries and syrups to fol. 75vb.

105 TK 317: "De cura stomachi frigidi . . . ," citing MS Vendôme 245, fols. 69-76.

106 Vatic. lat. 4440, fols. 109ra-117vb (or, 118-126): "In cura stomaci frigidi et humidi . . . / . . . Expliciunt recepte date per magistrum Nicolaum de Rado super 13a tertii de stomacho et eius passionibus." Fol. 118r-v or 127 is then left blank.

107 *Ibid.*, fols. 119ra-125r (or, 128-134), in a quite different hand from any before in the MS, "Incipit liber nove tradicionis per tabulas quem m. Petrus Marungus Salernitanus doctor compilavit. Cum mos sit quasi quiddam debitum de maximis et minimis . . ." Not in TK.

De Renzi, *Collectio Salernitana*, IV, 558-65, published the text or part of it from another MS in the then royal library at Naples: "Incipiunt Tabule Magistri Petri Maranchi. Cum omnibus mors (*sic*) sit quidem quoddam debitum de maximis et minimis acturi . . ."

Millàs Vallicrosa, *Las traducciones orientales en los manuscritos de la Biblioteca Catedral de Toledo*, Madrid, 1942, p. 122, gives another MS of it, 97-23, late 14th-early 15th century, fols. 66r-78v: "Incipiunt Tabule Magistri Petri Marachi, Amen. Cum omnibus mos sit et quasi quidam debitum de maximiis (*sic*) et minimis acturi . . . / . . . Expliciunt tabule composite per dominum magistrum Petrum Marachium in phisica professione."

a master Sernandus or Serando[108] or possibly, Serinando or Sezinando[109] of Pyonia[110] de Magistris. A friend has asked him to compose a brief treatment of urinoscopy, which he divides into three books. The first sets forth the significations of urines in a sick and feverish body; the third book, in a body which is not feverish. Avicenna and Isaac are cited repeatedly.

After some further notes on urines, some tabular charts, and a blank leaf, our manuscript terminates[111] with the work of Antonius Guarinerius, *De ventris fluxibus.*[112]

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108 Vatic. lat. 4440, fols. 125va-131ra (or 134-140): "Honora deum et honorabit te. Et time eum et cuncta te timebunt. Prepone eum et preponet te, et postea securus cuncta age. Liberet te deus a demone erroris et in viam veritatis te conservet . . . / . . . Urine parturientium ante partum et post partum sunt nigre et in istis apparet sicut attramentum et sicut sordities. Et sic est finis. Sit laus Christo deo nostro atque Beato Ieronimo. Amen. Expliciunt Authentica Urinarum composita a Magistro Sernando de Pyonia de magistris. Scripta per me Bovyn."

109 It hardly seems that Ferdinando is intended by the abbreviated form of the name.

110 Pionia was a bishopric on the Hellespont.

111 Except for two membrane leaves from an older MS which constitute back covers.

112 *Ibid.*, fol. 139ra (148), in a new humanistic and very legible hand, "Antonii Guarnerii Papiensis de ventris fluxibus commentariolus." A table of contents occupies the rest of the page. At fol. 139va, the usual incipit, "Volens de intestinorum egritudinibus doctrinam ponere a fluxu ventris principium sumere libet . . ." At fol. 170ra (179), "Explicit tractatus Guarnerii de ventris fluxibus. Scriptus per me Fredericum de Frisia alias de dodrum (?) a.d. M° CCCC° lxvi° 2a die mensis Septembris, Deo gratias."

The work is also found in Vatic. lat. 1214, fols. 71r-117r (see *A history of magic and experimental science*, IV, 672) and in a Venetian MS, Marc. VII, 47, of 1468 (see TK 778).

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Smallpox Inoculation in Colonial Boston

JOHN B. BLAKE*

WHEN inoculation of smallpox was first tried in Boston in 1721, it caused a violent controversy. Not only was its medical value disputed, but other issues were also involved, including theology, politics, the interference of the clergy in the secular affairs of the community, and the professional status of the physicians.[1] Many of these complications were peculiar to this incident alone, and within a few years the medical profession and most educated laymen generally agreed that inoculated smallpox was a milder disease than natural smallpox. The basic issue, the value of inoculation for the protection of the community as a whole from a deadly contagious disease, persisted almost until the practice was superseded by vaccination. Could inoculation prevent smallpox epidemics, and if not, could it significantly decrease the death rate of the entire community from smallpox? What were the best methods to achieve these ends?

Before these questions can be answered with regard to Boston, it is necessary to know something about the relation of smallpox to local disease conditions, and the people's reaction to its presence. Although there are no smallpox statistics for the seventeenth century, there is ample evidence of its deadly presence. There are figures on the total number of burials in Boston for each year from 1701 through 1774, and there is enough census material to provide fairly good estimates of the size of the population.[2] One obvious general feature is the high death rate, averaging

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1 For accounts of the controversy, see Joseph M. Toner, "History of inoculation in Massachusetts," Massachusetts Medical Society, *Publications*, 1867-68, 2, 153-172; Reginald H. Fitz, "Zabdiel Boylston, inoculator, and the epidemic of smallpox in Boston in 1721," *Johns Hopk. Hosp. Bull.*, 1911, 22, 315-327; George L. Kittredge. Introduction to Increase Mather, *Several reasons proving that inoculating or transplanting the small pox, is a lawful practice*. Cleveland, 1921, pp. 1-67; John T. Barrett, "The inoculation controversy in Puritan New England," *Bull. Hist. Med.*, 1942, *12*, 169-190; John B. Blake, "The inoculation controversy in Boston: 1721-1722," *New Engl. Quart.*, 1952, *25*, 489-506.

2 "Account of burials and baptisms in Boston, from the year 1701 to 1774," Massachusetts Historical Society, *Collections*, 1795, ser. 1, *4*, 213-215; Lemuel Shattuck, *Report to the Committee of the City Council appointed to obtain the census of Boston for the year 1845*. Boston, 1846, Appendix, 71-72; Lemuel Shattuck, "On the vital statistics of Boston," *Amer. J. med. Sci.*, 1841, *n.s. 1*, 369-373.

for the entire period in the neighborhood of 35 per 1,000. Equally outstanding is the wide annual variation. A change of 5 per 1,000 —roughly equal to that caused in Boston in 1918 by the devastating influenza pandemic—was a common occurrence. In spite of the high and variable death rate, however, smallpox stands out in the eighteenth century like the 1918 influenza in the twentieth. In the epidemic years of 1702, 1730, and 1752, the general death rate nearly doubled, and in 1721 it reached the phenomenal height of 105 per 1,000. No other disease which the Bostonians experienced ever caused such concentrated mortality. It struck swiftly and almost universally, sparing neither age, sex, nor social class. It was a loathsome disease, and of those who survived, many bore the marks of their affliction to the grave. It is no wonder that people lived in constant dread of its approach. Since it was also one of the few clearly recognized specific diseases which both doctors and laymen unequivocably agreed were contagious, the colonists were able to develop certain methods to combat it.

The principles and basic statutes of their policy were laid down before 1721. The first line of defense was quarantine. All incoming vessels which had had smallpox on board during their voyage, or which came from a place where smallpox was known to be prevalent, were required to undergo an examination by the Selectmen or a doctor under their direction. They removed the sick, the exposed, and their possessions to the isolation hospital on an island in the outer harbor, together with any cargo deemed infectious. Not until these goods and the ship had been cleaned and aired and all the crew and passengers were well, did the Selectmen allow them to approach the town. This was not always effective, however, and occasionally cases of smallpox occurred in town. The Selectmen then isolated the patients and their families by removing them to a pesthouse or by surrounding their homes with fences, red flags, and guards.[3]

These policies continued in effect throughout the eighteenth century, with ever-increasing rigor and with many refinements in statutory provision and administrative method. The vigor and comparative success with which they were pursued in the New England Colonies were in marked contrast to the more or less

[3] This account is based primarily on an examination of the statutes found most conveniently in Massachusetts General Court, *The acts and resolves, public and private, of the Province of the Massachusetts Bay* (21 vols., Boston, 1869-1922), and *Acts and resolves, 1780-1805* (13 vols., Boston, 1890-98); of the records of the Selectmen and town of Boston in Boston Record Commissioners, *Report* (39 vols., Boston, 1876-1909; vols. 24 to 39 issued as Boston Registry Department, *Records relating to the early history of Boston*); and of contemporary Boston newspapers.

endemic presence of smallpox in English cities, and to the more frequent presence of smallpox in populous sections of the Middle Colonies. From 1700 to 1775 there were only five epidemics in Boston which quarantine and isolation were unable to prevent or control. The people were strongly devoted to these policies, and as Dr. Benjamin Waterhouse pointed out:

> The inhabitants of New England view the small-pox with singular dread; . . . the malady has been kept at an awful distance, by restrictive laws, and still stronger popular impressions; so that in New England, the most democratical region on the face of the earth, the priest, the magistrate, and the people, have voluntarily submitted to more restrictions and abridgments of liberty, to secure themselves against that terrific scourge, than any absolute monarch could have enforced.[4]

The introduction of inoculation in 1721 brought a new factor into this situation which greatly complicated public health policies. To the older possibilities of smallpox or no smallpox was added a third, inoculated smallpox, which was always a premeditated act. The individual's desire to protect himself or his family against a deadly disease came into conflict with the desire of the community to achieve the same end, for while inoculation protected the individual from natural smallpox, unless properly managed it spread the disease to others. Some just method of reconciling this conflict was needed, and the experience of 1721 had failed to provide an answer.

Late in 1729 occasional smallpox cases began appearing in Boston, and although the Selectmen took the usual precautions for isolating the sick, the disease continued to smolder through January. During February it spread slowly and inoculation again became a topic of popular discussion. Even William Douglass, the leading opponent in 1721, recommended it, but many still disagreed. On February 24th several citizens petitioned the town to devise proper methods for preventing the spread of smallpox by inoculation. Before the town meeting convened, however, the disease began to spread more widely and the Selectmen removed the guards from infected houses. Taking the situation into their own hands, a number of inhabitants had themselves inoculated. When the voters met on March 10, it was already too late to do anything about it, and they confined themselves to entreating those who planned to be inoculated to warn their neighbors first and to stay in their homes till they were free of infection. Not ready to

[4] Benjamin Waterhouse, *A prospect of exterminating the small pox Part II, being a continuation of a narrative of facts concerning the progress of the new inoculation in America.* Cambridge, 1802, p. 6.

encourage inoculation, yet unable to prevent it, the town of necessity accepted it and tried to minimize its tendency to spread the disease. Altogether, nearly four hundred people were inoculated, of whom twelve died. On the other hand there were about thirty-six hundred cases of natural smallpox, with nearly five hundred deaths.[5]

The figures proved again that the death rate for inoculated smallpox was much lower than for natural. The epidemic also prompted the General Court to pass a law which in effect laid down the first of the basic policies governing the future conduct of inoculation. Among other things it required heads of families to notify the Selectmen whenever anyone in their households came down with smallpox, unless more than twenty families in town were known to have the disease at the same time.[6] Undoubtedly the reason for the proviso was a brief that once the situation was that bad, traditional controls could no longer keep it from spreading. By interpretation and administration, the twenty-family rule became the standard, in the absence of other specific authority, for permitting inoculation.

Although smallpox appeared on incoming vessels and even within the town from time to time during the next twenty years, prompt protective measures prevented the development of any epidemics, and inoculation was never allowed. Then, on Christmas Eve, 1751, when the people of Chelsea went to the rescue of a ship from London wrecked in Nahant Bay, they caught the smallpox. On January 6th the first case appeared in Boston. For over two months the Selectmen were able to keep it under control by their usual methods, and the physicians promised not to inoculate anyone without due notice. Finally, however, the town fathers were forced to admit defeat. On March 23d they announced that there were so many cases they feared "no Method can be taken to prevent the spreading of that Distemper."[7]

This was the signal. Immediately inoculation started, and it proved far more popular than in 1730. Inoculation literature, old and new, was already appearing. Not all of it was favorable. Speak-

[5] Mass. Gen. Court, House of Representatives, *Journals*. Boston, 1919-, *9*, 120, 122, 133, 136; *Boston News-Letter*, Oct. 30, 1729, Jan. 8-Mar. 19, 1729-30, Mar. 26, 1730; *Boston Gazette*, Dec. 1, 1729, Jan. 12, 21, Feb. 2, Mar. 16, 1729/30, Mar. 30, 1730; Record Commissioners, *Report*, *12*, 14-15; William Douglass, *A summary, historical and political, of the first planting, progressive improvements, and present state of the British settlements in North-America*. London, 1755, II, 397; Shattuck, "Vital statistics of Boston," 373.

[6] 1731-32, ch. 13, Mass. *Acts and resolves*, *2*, 621-622.

[7] Douglass, *Summary, historical and political*, II, 397; *News-Letter*, Jan. 9, 16, 23, Feb. 13, 20, 27, 1752; *Boston Evening-Post*, Mar. 9, 1752; *Boston Post-Boy*, Mar. 16, 23, 1752.

ing for many, no doubt, was the author of a letter published in the *Evening-Post* on April 13th. According to his information, there were by April 6th about six dead, fifty recovered, and forty then sick from natural smallpox, and perhaps twelve hundred inoculated cases. The advocates claimed the more, the better, because it would save lives, clear the town of infection sooner, and let people return to their business. The writer thought it very dangerous, for there were far too many for the physicians to care for should any considerable number of them, as was possible, break out with dangerous symptoms. He continued:

> It may also be worthy of their [the physicians'] Reflection, that as by inoculating such Numbers *at once,* in all Parts of the Town, a vast many will speedily be infected in the *natural Way,* whether *they* will not be chargeable with *increasing the general Distress?* For, if the inoculated (who have many Friends) can scarce procure the necessary Assistance *at this Time,* what will become of the many *Poor (who cannot be inoculated)* in that Time of dreadful Calamity?

To some extent this writer's fears seem to have come true. During January, February, and March there were only five deaths from smallpox, but early in April those who had been inoculated late the month before broke out with the disease, and it quickly spread. Many more people caught it the natural way than by inoculation, and nearly all who died were among the former. The toll mounted rapidly. During April there were 119 deaths from the disease; in May there were 205 and in June 203. By the end of this month, the epidemic was waning, and during July there were only 31 deaths. By July 27th there were only seventeen infected families, and the Selectmen prohibited further inoculation. The reason for the decline is obvious: there were hardly any susceptible people left. By mid-August the epidemic was over.[8]

According to the final statistics, out of a population of 15,684, 5,998 had had the disease before, 1,843 moved out of town, and only 174 remained in town without catching it. There were 7,669 cases of smallpox, nearly half the entire population. Among these were 5,545 cases of natural smallpox with 539 deaths, and 2,124 of inoculated with 30 deaths.[9] Clearly these results added further proof, though it was hardly needed, that the death rate from inoculated smallpox was substantially lower than that from natural. If

[8] Thomas Prince, "Observations on the state of the small pox at Boston, in 1752," *Gentleman's Magazine, and Historical Chronicle* (London), 1753, *23*, 414; John Tudor, *Deacon Tudor's diary*. William Tudor, Ed. Boston, 1896, pp. 7-8; *Post-Boy*, July 6, Aug. 17, 1752; *Evening-Post*, July 27, 1752; Record Commissioners, *Report*, *17*, 283.

[9] Prince, "Observations on the small pox," 414. There are minor discrepancies between his statistics and those recorded by the Selectmen, Record Commissioners, *Report*, *17*, 283.

there had been no inoculation, the disease unquestionably would not have spread as fast as it did, and the total number of cases might well have been smaller. Yet it seems safe to say that inoculation of about twenty-two per cent of the nonimmune inhabitants did lower the impact of the epidemic on the community's death rate.[10]

For a decade the Selectmen were able to prevent any more epidemics. Late in December 1763, however, another round of cases began which did not have such a fortunate outcome. By January 17th there had been a total of ten cases, and the people were becoming alarmed. Many of those who were able to do so fled. Some people wanted to start inoculation, and others, among them the governmental officials, feared they would. The Governor and Council issued a proclamation forbidding it until the Selectmen should give permission, and as the number of infected houses approached twenty, the Selectmen got the legislature to pass an emergency act raising the critical figure to thirty. Through February they continued their control measures. More and more cases were reported, but as some went to the pesthouse and others died, the total number of infected families at any one time gradually declined, till on February 23d the Selectmen jubilantly reported that there were only five.[11]

By then inoculation had started outside the town. The issue naturally arose as soon as it became apparent that there was any chance of the disease spreading. There was, moreover, stronger sentiment in favor of the practice than ever before. In part this was due to developments which had taken place in other colonies. Inoculation was introduced to Philadelphia in 1730 and tried again in 1736-37. In 1750 it excited renewed attention, and in that year Dr. Adam Thompson published a tract recommending, on the basis of suggestions in Boerhaave, preparatory treatment with mercury and antimony. Most of his fellow practitioners strenuously opposed this idea at first, but certain New Jersey doctors took it up, among them a Dr. William Barnet. When smallpox struck the Quaker city again in 1759, Benjamin Franklin tried to

[10] Assuming that Prince's figures were correct, that all who had inoculated smallpox would otherwise have had natural, and that the death rate for this group would have been the same as it was for those who did have natural smallpox, we may conclude that another 177 people would have died and that the death rate from smallpox would have been 48 per 1000 population instead of 36 per 1000, an increase of 33 per cent.

[11] Record Commissioners, *Report, 19,* 290-292; *20,* 1-43; 1763-64, ch. 17, Mass. *Acts and resolves, 4,* 668; *News-Letter,* Jan. 19, 26, 1764; *Gazette,* Jan. 23, 1764; James Gordon to William Martin, erroneously dated Mar. 9, 1764, Mass. Hist. Soc., *Proceedings,* 1899-1900, ser. 2, *13,* 389.

popularize a simpler English method, but the mercury-antimony preparation became the accepted one, and Dr. Barnet was invited to set up a private inoculation hospital in Philadelphia. The successes of those who used these drugs—whether because of them or in spite of them—and treated their patients in private hospitals made it seem to many that inoculation was almost infallible.[12] Now that smallpox had appeared in Boston, about the middle of January 1764 several "Gentlemen of Distinction" invited Dr. Barnet to come there.[13]

Since inoculation within the town was forbidden, strong support for special hospitals grew rapidly. Many people, of course, desired them because they wished to have themselves and their families inoculated before they caught the disease in the natural way. Others advocated them in order to accommodate the inoculationists without endangering the town. They hoped the hospitals would ease the pressure for allowing inoculation within Boston and therefore tend to prevent the spread of the epidemic.[14] In 1761, when there had been grave danger that the smallpox then present might get out of hand, Dr. Silvester Gardiner had proposed establishing a hospital in Boston, but the town had turned him down.[15] In January 1764 the House of Representatives still refused to accept this idea,[16] but shortly after proroguing the General Court, the Governor and his Council on their own authority arranged with the Selectmen and several physicians to open an inoculation hospital on Point Shirley in Chelsea. A special committee devised regulations to prevent smallpox from spreading from the hospital, and on February 20th it was in operation. It cost money of course. The charge was one pound, five shillings, four pence per person for medicines and professional attendance,

12 Henry Lee Smith, "Dr. Adam Thomson, the originator of the American method of inoculation for small-pox." *Johns Hopk. Hosp. Bull.*, 1909, *20*, 49-52; George W. Norris, *The early history of medicine in Philadelphia.* Philadelphia, 1886, pp. 104-113; Adam Thompson, article in *Virginia Gazette*, April 17, 1761, reprinted in *Boston Gazette*, Jan. 30, 1764; Arnold C. Klebs, "The historic evolution of variolation," *Johns Hopk. Hosp. Bull.*, 1913, *24*, 73-82; Carl Van Doren, *Benjamin Franklin*, New York, 1938, pp. 296-297; Whitman M. Reynolds, "Inoculation for the smallpox in colonial America," *Bull. Hist. Med.*, 1948, *22*, 273-276. As an example of how important the use of these chemicals seemed to contemporaries, see the bitter newspaper war engendered in Boston when William Greenleaf, Jr., a druggist, was accused of supplying adulterated calomel to the physician in charge of an inoculation hospital. *Gazette*, Apr. 23-July 16, 1764, *passim.*

13 *Gazette*, Jan. 23, Feb. 13, 1764.

14 *News-Letter*, Jan. 19, 26, Feb. 9, 16, 23, 1764; *Gazette*, Feb. 13, 1764; *Evening-Post*, Feb. 6, 20, 1764; Mass. *Acts and resolves*, *4*, 697; Record Commissioners, *Report*, *16*, 103.

15 Silvester Gardiner, "To the freeholders and other inhabitants of the town of Boston, in town meeting assembled, March, 1761," broadside reprinted in Mass. Hist. Soc., *Proceedings*, 1858-60, *4*, 325-328; Record Commissioners, *Report*, *16*, 51-52.

16 Mass. Gen. Court, House of Representatives, *Journal. Boston*, 1763-64, pp. 214-215.

plus three dollars a week for food, nursing, and other necessities.[17] So popular was this development that on February 27th the Governor made the barracks at Castle William available to all physicians for inoculation.[18]

The pressure for allowing inoculation did not ease, however, and early in March, when the situation began to deteriorate again, the Selectmen gave up trying to control the epidemic. The physicians of Boston agreed with the Overseers to treat the poor free of charge, and on March 13th the town voted to allow anyone, inhabitant or not, to be inoculated until April 20th.[19] Boston quickly became one great hospital, as thousands of citizens went through the operation and hundreds poured in from other towns and even from other colonies to take advantage of this opportunity. The physicians did a rushing business, and several professional inoculators besides Barnet came in from outside.[20] Before the epidemic was over nearly everyone who did not flee—or who had not had the disease before—caught it, either naturally or by inoculation. By June 30th, according to the official census, there had been 699 cases of natural smallpox with 124 deaths, and 4,977 cases of inoculated with 46 deaths. Of the latter, 1,025 had passed through the disease under the inspection and care of the Overseers of the Poor and about 400 came from other towns.[21]

Several significant results emerged from this epidemic. For the first time inoculation hospitals were tried in Boston. As usual, the death rate among the inoculated was far more favorable. More important was the greatly increased use of the technique. In 1721 about two per cent of the smallpox cases in Boston were by inoculation, in 1730 ten per cent, and in 1752 twenty-eight per cent. In 1764, excluding the four hundred noninhabitants, the percentage rose to eighty-seven. This lowered the death rate for smallpox so markedly that for the first time a smallpox year failed to stand out as one of unusual mortality. Aside from the fact that more people believed in it, one of the major reasons for this change was that for the first time arrangements had been made for inoculating the poor.

17 *News-Letter*, Feb. 9, 16, Mar. 8, 1764; *Gazette*, Feb. 13, 1764. The rates for children were slightly lower.

18 *Gazette*, Feb. 27, 1764.

19 Record Commissioners, *Report*, *16*, 105-106, 109, 112; *20*, 49; *News-Letter*, Feb. 23, 1764; *Gazette*, Feb. 27, Mar. 5, 19, 1764.

20 *News-Letter*, Mar. 15, 22, 29, Apr. 13, 1764; *Gazette*, Mar. 12, 19, 26, May 28, 1764; *Evening-Post*, Mar. 12, 1764; *Post-Boy*, Apr. 9, 23, 1764; James Gordon to William Martin, Mass. Hist. Soc., *Proceedings*, 1899-1900, ser. 2, *13*, 390.

21 Record Commissioners, *Report*, *16*, 116; *20*, 80.

The aftermath of the epidemic nevertheless showed that the practice was still acceptable to the majority only as a last resort. On April 20th the period allowed for inoculation was over, and the Selectmen were faced with the problem of clearing the town of infection. One difficulty was caused by a number of people who had failed to be inoculated when they had the opportunity, and who were now coming down in the natural way and perpetuating the epidemic. Several began to regret their previous decision, so the Selectmen gave the physicians permission to inoculate those who had been in town on or before April 20th, hoping in this way to speed its passage through the town.[22] A more serious problem was that outsiders persisted in coming in for inoculation, and they were able to find doctors willing to oblige. In town meeting the citizens called on the legislature to act, while the Selectmen warned such people of "that resentment which has risen and is still rising in the Breasts of Multitudes of the Inhabitants against those who attempt so grossly to abuse them as to make this Town a Hospital, not withstanding proper Hospitals are provided conveniently situated to receive such as incline to take the Distemper."[23]

Even the hospitals were now looked upon adversely. Inoculation at Castle William ended May 12th, but with the permission of the Selectmen the attending physicians opened a new hospital on Noddle's Island. Many people, however, believed that these places tended to continue the epidemic, and on May 24th the voters decided not to allow any inoculation hospitals within the town's boundaries.[24] Point Shirley was outside Boston's jurisdiction, and when reports came in that people were returning from there "quite Green with the Small Pox and very infectious," the Selectmen, fearing that the resentful inhabitants would take their own "extraordinary steps," warned Dr. Barnet of an "unhappy event" if he did not make sure that no one left until he was completely free from infection.[25]

On June 15th, in answer to Boston's request, the General Court passed a new law rigidly restricting inoculation. It provided severe penalties for a noninhabitant who was inoculated in Boston without the Selectmen's permission, for anyone who, having had small-

22 Record Commissioners, *Report, 20,* 59; *News-Letter,* Apr. 26, May 3, 1764; *Gazette,* May 7, 1764.

23 Record Commissioners, *Report, 16,* 117-118; *20,* 59, 61, 64-65; *News-Letter,* May 10, 1764.

24 Record Commissioners, *Report, 16,* 123; *20,* 60; *News-Letter,* Apr. 26, May 17, 24, 1764; *Gazette,* Apr. 23, May 21, 28, 1764.

25 Record Commissioners, *Report, 20,* 69-70; see also, *ibid., 20,* 73; *Evening-Post,* June 11, 1764; *News-Letter,* June 14, 1764.

pox by inoculation or otherwise, moved from the house where he was staying while sick into any town where smallpox did not generally prevail, and finally for anyone who "willfully, wantonly or carelessly" communicated smallpox to another person. The law also forbade the use of any house as an inoculation hospital without the town's prior consent, and all physicians and nurses employed in smallpox hospitals were required to reside there constantly, lest by passing from place to place they endanger others.[26]

Popular opposition continued during the next few years, in Boston and elsewhere in Massachusetts. In 1771 Dr. Samuel Gelston, a professional inoculator, undertook to set up a hospital on a tiny island about a mile west of Nantucket. The people in the nearby town of Sherborn feared this would spread the disease among them, and on their petition the General Court immediately ordered Gelston to stop.[27] An inoculation hospital erected on an island near Marblehead in 1773 was soon after burned to the ground by a mob. When two of the ringleaders were arrested, another mob rescued them from the Salem jail. Popular feeling was with them, and the matter ended there.[28] In Boston, although smallpox threatened to become epidemic early in 1775, the voters decided that as long as there was any chance of controlling it, there should be no inoculation.[29]

The Revolution, however, brought a marked change in the popular attitudes. While Boston was under siege from April 1775 to March 1776, smallpox ran rife in the town, but the revolutionary government was able to keep it from getting into the army or the surrounding countryside.[30] After the British had evacuated, however, it soon proved impossible to maintain isolation procedures, and the disease began to spread. Despite the efforts of the civilian and military authorities, many people, some soldiers among them, faced with the alternative of catching the natural disease, secretly had themselves inoculated instead. Despairing of controlling the disease, the government decided to

26 1764-65, ch. 12, Mass. *Acts and resolves, 4,* 728-729.

27 Mass. *Acts and resolves, 18,* 567.

28 Samuel A. Green, *History of medicine in Massachusetts.* Boston, 1881, pp. 77-78; Mary Vial Holyoke, "Diary," G. F. Dow, Ed. *The Holyoke diaries, 1709-1856.* Salem, 1911, pp. 81-82.

29 Record Commissioners, *Report, 18,* 223-224.

30 Mass. *Acts and resolves, 19,* 9-10, 15, 17, 95-96, 157, 165, 172; John Morgan, *A recommendation of inoculation, according to Baron Dimsdale's method.* Boston, 1776, p. 11; Allen French, *The first year of the American revolution.* Boston, 1934, pp. 493-495; Louis C. Duncan, "Medical men in the American revolution, 1775-1783," *Army med. Bull.,* 1931, no. 25, pp. 16, 66; James E. Gibson, *Dr. Bodo Otto and the medical background of the American revolution.* Springfield, Ill., 1937, pp. 88-90.

get the epidemic over with as soon as possible, and a general inoculation of soldiers and civilians in Boston followed.[31]

The Bostonians were not the only ones who, prompted by fear of natural smallpox, were secretly taking it by inoculation, for it seemed certain the infected troops would spread it over the countryside. Further pressure came from those who wished to be inoculated without exposing themselves to the penalties of the law. The members of the General Court finally came to the conclusion that the best way to prevent people from performing the operation secretly and thereby endangering their fellow citizens was to legalize and regulate it. On July 9, 1776, they passed a law permitting the county courts to allow inoculation hospitals in such places and under such regulations as they judged most convenient and safe for the inhabitants. Anyone who inoculated or was inoculated elsewhere, except in a town where more than twenty families were known to have smallpox, was subject to a severe penalty.[32]

This hastily contrived legislation soon aroused opposition. Some complained because the justices allowed inoculation hospitals in towns whose inhabitants did not want them, some because the justices refused to allow them where they were wanted, and some because they were improperly managed.[33] It was therefore revised in April 1777 to prohibit the hospitals in any town without its consent. The amendment also stipulated certain basic regulations to which all hospitals must conform. There had to be proper facilities for cleansing all patients of infection before they left, and preference had to be given to local inhabitants and to those who might be soldiers in the coming campaign. Each patient had to give a bond of ten pounds, and the physicians one of five hundred pounds, to observe the requirements.[34] Two months later the General Court passed a special order for military reasons prohibiting any inoculation in the towns surrounding Boston harbor, but when smallpox became threatening the following March, the town voted to allow general inoculation anyway. The legislators quickly abandoned any idea of preventing the practice. They not only repealed the prohibitory order, but passed a resolve tem-

31 1776-77, ch. 8, Mass *Acts and resolves*, 5, 555-557; *ibid.*, 5, 661-662; *19*, 290; James Thacher, *A military journal during the American revolutionary war*. Boston, 1823, pp. 50, 53-54; Ezekiel Price, "Diary, 1775-1776," Mass. Hist. Soc., *Proceedings*, 1863-64, ser. 1, 7, 259-260; French, *First year of the revolution*, p. 671; Francis R. Packard, *History of medicine in the United States*. New York, 1931, I, 83-85.

32 1776-77, ch. 7, Mass. *Acts and resolves*, 5, 554-555; *ibid.*, 5, 661, 663; Morgan, *Recommendation of inoculation*, pp. 11-12.

33 Mass. *Acts and resolves*, 5, 663, 713; *19*, 585, 874.

34 1776-77, ch. 39, Mass. *Acts and resolves*, 5, 633-635.

porarily permitting any town in the state to erect inoculation hospitals under the regulation of the Selectmen alone, dispensing in the emergency with the need for a license from the county court.[35]

Obviously, while many still feared that inoculation would spread smallpox, it had become on the whole far more popular since the Revolution began. Even the ordinary folk who had earlier led the opposition, and who were still sometimes suspicious of the private hospitals, seemed ready enough to take the disease this way when it was financially possible and the chances of avoiding natural smallpox were slim. Prior to the Revolution the popular attitude was that inoculation was to be used solely as a last resort, after it became apparent that it would be practically impossible to avoid natural smallpox; during and after the Revolution, the popular attitude became that if there was any chance of getting natural smallpox, it was time to inoculate. The people's confidence in inoculation, and their willingness to be inoculated, had greatly increased.

So well established had the practice become during the war years, that when in 1783 four physicians petitioned Boston for permission to carry on inoculation on Apple Island, though there was then no particular threat of an epidemic, the town readily granted their request. In 1788, when there were several cases of smallpox in nearby towns, the authorities permitted inoculation hospitals in Watertown, Newton, Medford, and Brookline, and in 1789 on Rainsford Island in Boston harbor. Inoculation continued on Rainsford Island for several years, and in Brookline, at Dr. William Aspinwall's extensive establishment, until vaccination rendered it obsolete.[36]

Only once more, in 1792, was there a great epidemic in Boston. When it became apparent that smallpox was spreading, the town voted overwhelmingly for inoculation, and called on the Overseers to employ physicians to inoculate and care for the poor. Of all the smallpox cases among the inhabitants, ninety-seven per cent were by inoculation and only 262 people left town to escape the disease. Like other epidemics, this one, which had affected much of the eastern part of the state, prompted new legislation. It was primarily designed to tighten up the administrative control of natural

[35] Mass. *Acts and resolves*, 20, 15-16, 352, 354; Record Commissioners, *Report*, 26, 14-16.

[36] Record Commissioners, *Report*, 26, 323-324; Registry Dept., *Records relating to early Boston*, 31, 188, 223, 282, 284; Mass. *Acts and resolves*, *1788-89*, 368; Benjamin Waterhouse to John Haygarth, October 28, 1788, quoted in John Haygarth, *A sketch of a plan to exterminate the casual small-pox from Great Britain*. London, 1793. II, 325-329.

smallpox, but at the same time it further facilitated the establishment of inoculation hospitals.[37] Unquestionably inoculation had become an accepted practice.

From the introduction of this procedure through the epidemic of 1752, it grew slowly, and it failed to realize its potential ability drastically to reduce the community's death rate. The opposition to inoculation in each succeeding epidemic, though declining, continued strong. Many still did not trust it and preferred to take their chances on getting natural smallpox. Then too, as Benjamin Franklin pointed out, "the expense of having the operation performed by a surgeon weighs with others, for that has been pretty high in some parts of America; and when a common tradesman or artificer has a number in his family to have the distemper, it amounts to more money than he can well spare."[38] These people opposed allowing others to inoculate because, as practised, it did help spread the disease to those who for whatever reason were unwilling or unable to be inoculated. By the 1760's and early '70's, however, its value was more clearly accepted, and arrangements were made to inoculate the poor during an epidemic. This helped substantially in making it far more widespread in the epidemic of 1764 and in greatly lowering the death rate. In each succeeding epidemic the vast majority always took the disease by inoculation.

By the '60's inoculation hospitals, first suggested by an anonymous pamphleteer in 1721, were being tried in other colonies. In Boston in 1764 they were accepted temporarily for special reasons. But in nonepidemic periods they continued to be exceedingly unpopular with the majority. Although far safer than natural smallpox, the inoculated variety was more dangerous and unpleasant than no smallpox at all, and many people hoped, with some reason, that if inoculation was prohibited, they could avoid the disease altogether. Moreover, the practice was time-consuming and expensive. In a general epidemic, when it was freely allowed within the town, this made less difference, since one could go through it at home, and trade and business were completely disrupted anyway. But ordinarily the common citizen could not afford to be absent from his work for the month or more necessary to go through the whole process, much less to pay for the expenses of doctor, nurses, food, and lodging at an inoculation hospital. The latter were of no benefit to the great majority, who saw them only

[37] Registry Dept., *Records, 31,* 302-304, 307-308; 1792, chs. 28, 58, Mass. *Acts and resolves, 1792-93,* 50-53, 85-88.

[38] Quoted in Van Doren, *Franklin,* p. 297.

TABLE 1

		Natural			Inoculated			All cases, Boston residents only								
Year	Population	Cases	Deaths	Deaths per 1,000 cases	Cases	Deaths	Deaths per 1,000 cases	Cases	Deaths	Deaths per 1,000 cases	Cases per 1,000 population	Deaths per 1,000 population	Per cent of cases inoculated	Left town	Escaped disease	Had smallpox before
1721	11,000	5,759	842	146	287[1]	6[2]	21	5,889	844	143	535	77	2	.....	.....	.....
1730	13,000	3,600	500	139	400	12	30	4,000	500	125	308	38	10	.....	.....	.....
1752	15,684	5,545	539	97	2,124	30	14	7,669	569	74	490	36	28	1,843	174	5,998
1764	15,700	699	124	177	4,977[3]	46	9	5,276	170[4]	32	336	11	87	1,537	519[5]	ca. 8,370
1776	.....	304	29	95	4,988[6]	28	6	4,063	57[4]	14	.....	....	90	.....	.....	.....
1778	.....	122	40	328	2,121	19	9	2,243	59	26	.....	....	95	.....	.....	.....
1792	19,300	232	69	298	9,152[7]	179	20	8,346	248[4]	30	432	13	97	262	221	ca. 10,300

[1] Including 157 inoculated in neighboring towns.
[2] Including 4 deaths in neighboring towns.
[3] Including about 400 nonresidents inoculated in Boston.
[4] No allowance is made for the possibility that some of the deaths occurred among nonresidents inoculated in Boston.
[5] Most of these were out of town during most of the epidemic.
[6] Including 1329 nonresidents inoculated in Boston.
[7] Including 1038 nonresidents inoculated in Boston.

as possible sources of infection, threatening death to those who were susceptible and economic distress to the whole community.

The Revolution helped greatly to popularize the practice. The disruption of ordinary government together with the movements of troops, recruits, and returning veterans played havoc with the old preventive measures and spread smallpox widely. Massachusetts was forced to devise a policy for permitting inoculation under proper supervision. With the return of peace, this system of inoculation hospitals was allowed to continue. It certainly benefited the individuals fortunate enough to be able to pay. It was perhaps a source of some protection to others by removing in part the temptation to inoculate secretly and by relieving the pressure to allow general inoculation whenever there was the slightest possibility of an epidemic.

From the point of view of the community, however, the hospitals were unable to protect a sufficiently large number to be of much significance. They were obviously unable to prevent epidemics among the general population. When properly regulated by governmental authority, as, in time, they were, they were no danger to the community and could therefore be safely permitted. From the community standpoint, what inoculation could do, and did do from 1764 on, when the government arranged to inoculate the poor, was to lower the death rate markedly when a smallpox epidemic became inevitable. Inoculated smallpox was not a pleasant affair. It caused some loss of life and brought in its train great personal suffering, especially among the poor, and great economic loss to the entire community. It certainly was not the equivalent of universal protection by vaccination. But compared to an epidemic of natural smallpox, it was indeed a blessing.

NOTE ON TABLE 1

At least three similar tables have been printed: by Thomas Pemberton in "A topographical and historical description of Boston, 1794," Massachusetts Historical Society, *Collections,* 1794, reprinted 1810, ser. 1, 3, 292; by "Investigator," *Columbian Centinel,* July 24, 1802; and three times by Lemuel Shattuck, "On the vital statistics of Boston," *Amer. J. med. Sci.,* 1841, *n.s. 1,* 373; *Report to the Committee of the City Council appointed to obtain the census of Boston for the year 1845.* Boston, 1846, p. 144; *Report of a general plan for the promotion of public and personal health . . .* Boston, 1850, p. 70. Only "Investigator" gave the sources of his information.

1721: In February, 1721/22, the Selectmen took a census of the population, including the number of smallpox cases and deaths. They reported that 10,567 people continued in Boston, that there were 5,889 cases and 844

deaths (*Boston News-Letter,* February 26, 1721/22; William Douglass, *A summary, historical and political, of the first planting, progressive improvements, and present state of the British settlements in North-America.* London, 1755, II, 396). Douglass's statement that there were 5,989 cases is an error, perhaps a misprint. Zabdiel Boylston recorded his 247 inoculated cases and 39 performed by other physicians both in Boston and neighboring towns in *An historical account of the small-pox inoculated in New England, upon all sorts of persons, whites, blacks, and of all ages and constitutions* . . . 2d ed., Boston, 1730, p. 34. He later recorded one additional case not in his book, bringing the total in and about Boston to 287 (*News-Letter,* Mar. 5, 1729/30). It is apparent from Boylston's records that between 121 and 138 only of his detailed cases in the *Historical account* were residents of Boston. If the figure is set at 130, this, added to the 5,759 cases of natural smallpox stated by Boylston to have occurred in Boston (*Historical account,* p. 33), gives the total of 5,889 cases recorded by the Selectmen. Boylston gave the number of deaths from natural smallpox as 844. It seems probable, however, that the Selectmen included in this total the two Boston residents among Boylston's six fatal cases, so I have listed deaths from natural smallpox at 842. None of the other three tables takes into account the 39 cases inoculated by other physicians, nor the fact that many of Boylston's patients were not residents of Boston. I have included the six people inoculated by Boylston in May 1722, but have not included the scattering of natural cases in April and May 1722 (John B. Blake, "The inoculation controversy in Boston: 1721-1722," *New Engl. Quart.,* 1952, *25,* 497).

1730: The population is estimated from the censuses of 1722 and 1742 (Shattuck, *Census of Boston 1845,* pp. 3, 5). The other figures are only approximate estimates given by Douglass (*Summary, historical and political,* II, 397).

1752: The statistics used here were given by Thomas Prince, "Observations on the state of the small pox at Boston, in 1752," *Gentleman's Magazine, and Historical Chronicle,* 1753, *23,* 414. There are minor discrepancies between them and those recorded by the Selectmen (Boston Record Commissioners, *Report, 17,* 283) taken before the epidemic was completely over. Pemberton and "Investigator" gave the Selectmen's figures, Shattuck, Prince's. Although there may have been some nonresidents inoculated in Boston during the epidemic, Prince's statistics apparently applied to the local population only.

1764: The population is estimated from the census of 1765 (Record Commissioners, *Report, 20,* 170). My figures are those given by the Selectmen (*ibid., 20,* 80). Pemberton listed 669 natural cases, probably a misprint. Shattuck, in giving the total number of cases, did not subtract the number of nonresidents.

1776: My figures are those given by Pemberton and "Investigator." Shattuck gave only 18 deaths from inoculated smallpox and included nonresidents in his total number of cases. He did not indicate how he obtained his population estimates for 1776 or 1778 and I have found no reliable figures. The disruption caused by the Revolution makes any estimate highly speculative, so I have given none.

1778: My figures are from the Selectmen's enumeration as reported in *Boston-Gazette,* May 18, 1778. "Investigator" did not list any figures for this epidemic. The other tables list 42 deaths from natural smallpox.

Shattuck gave 29 deaths from inoculated smallpox, perhaps a misprint. No information was given on nonresidents inoculated in Boston. However, the town voted to allow ten days for inoculation of the inhabitants only (Record Commissioners, *Report, 26,* 15-16), and the number of nonresidents, if any, was probably negligible.

1792: The population is estimated from the United States censuses of 1790 and 1800. The other figures are from the Selectmen's enumerations. After the first one, taken October 5-6, 1792, when 181 people were still sick, they reported only 33 deaths from natural smallpox and 165 deaths from inoculated, and these numbers were used by Pemberton, "Investigator," and Shattuck. They must be revised, however, because another count two weeks later raised the mortality figures to 69 natural and 179 inoculated, with 62 people still sick (Boston Registry Department, *Records relating to the early history of Boston, 31,* 307-308). In this connection see the comment on "Investigator's" table that not less than 30 people died after the first enumeration, in *Columbian Centinel,* July 28, 1802. This time Shattuck subtracted the number of nonresidents from his figures for inoculated and total cases.

Charles Gilbert Chaddock

His Life and Contributions

JAMES L. O'LEARY* AND WALTER L. MOORE**

A NEUROLOGICAL bibliophile leafing through the now obscure *Interstate Medical Journal* for 1914 might be surprised to find authorized translations from the best works of Joseph Babinski. These—together with the medicolegal wranglings in a celebrated St. Louis homicide case of the mid-90's, the English translation of Krafft-Ebing's *Psychopathia sexualis,* and two clinical signs—are an introduction to Charles Gilbert Chaddock, a worthy pioneer whom biographers have grossly neglected.

What led us to this study of Chaddock? One answer lies in a universal of neurology—appreciation for the exacting examination of the patient. Of that he was a brilliant exponent. His clear, crisp writing gave to his contemporaries amongst the midwest practitioners the best of neurological knowledge just as it was coming to be known in England, France, and Germany. That the currents of his life blended to some extent with those of Babinski and Ramón y Cajal lends further interest. The versatile Chaddock was an accomplished linguist, who translated Horace from the Latin as capably as he did Krafft-Ebing from the German and Babinski from the French, and also a poet and litterateur. It is said that on occasion he also translated from the Greek. Chaddock was possessed of that philosophical spirit which Thomas Brown[1] defined so well:

> There is a philosophic spirit which is far more valuable than any limited acquirements of philosophy; and the cultivation of which, therefore, is the most precious advantage that can be derived from the lessons and studies of many academic years:— a spirit which is quick to pursue whatever is within the reach of human intellect; but which is not less quick to discern the bounds that limit every human inquiry, and which therefore, in seeking much, seeks only what man may learn. . . .

Chaddock was born on 14 November 1861 in Jonesville, Michigan. His father was also a physician and served during the Civil War as Surgeon of the Michigan Seventh Volunteer Infantry.

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1 Brown, Thomas. *Lectures on the philosophy of the mind,* 16th ed. Edinburgh, William Tait, 1846.

Chaddock was graduated from the University of Michigan College of Medicine and Surgery in 1885, thereafter becoming a staff physician at Northern Michigan Asylum in Traverse City. He spent 1888-1889 studying in Munich. In 1890 he married Adelaide Gowans MacPherson. On his return from Munich he was promoted to Assistant Superintendent of the Asylum (now Traverse City State Hospital), remaining there until December 1892 when he moved to St. Louis. There he became Professor of Nervous and Mental Diseases at Marion-Sims College, succeeding Professor C. H. Hughes, the founder of the journal, *Alienist and Neurologist.* Marion-Sims was later amalgamated with Beaumont Medical College, which eventually became the Medical Department of St. Louis University. Besides Hughes, Malcolm Bliss, Frank Fry and Sidney Schwab were among Chaddock's contemporaries in neuropsychiatric practice in the city.

Hospital appointments to the City Hospital of St. Louis and City Sanitarium (now St. Louis State Hospital) are mentioned here, for several of our informants came under the influence of Chaddock's inspirational teaching at one or the other of these institutions. His external malleolar sign, now called Chaddock's sign, was based upon case studies from the wards of the former. The years 1897-1899 were spent in Paris as assistant to J. Babinski. Subsequently, Chaddock often returned to Paris. Long visits are recorded in the summers of 1902, 1903, 1908, 1909, 1913, and 1921, and probably there were others. Thereafter Chaddock seems to have spent much of his life in reading, translation, the writing of poetry, and in correspondence. He died on 20 July 1936 at the age of seventy-four. Mrs. Chaddock died the following year.

Chaddock is described by his friends as having been tall, rather spare, and nearsighted (Fig. 1). Some recall him as soft-spoken and courteous to the point of being naturally suave; others refer to him and Mrs. Chaddock as natural aristocrats. Most of those who were his friends had marked cultural and literary interests apart from their professional activities and had been on extensive European sojourns. However, it is likely that they became Chaddock's intimates because they recognized how much he had to offer and went about overcoming his shyness, one of his important characteristics. Others were attracted to Chaddock by his eagerness to impart his knowledge of neurology. As they learned, they came to recognize that their other interests were also being molded by a cosmopolite. Several friends have noted that he seldom talked

about anything that touched upon his abilities, experiences, or accomplishments. Paradoxically, he was genuinely affected by the appreciation of others, yet seemed reluctant to give them more for

FIG. 1. Chaddock as he appeared at the time of his work upon the ankle sign. Drawn by W. H. French from a 1906 snapshot and a 1912 photograph.

which to praise him. Because of this it has been difficult to trace more than the highlights of his career. Replies to the oft-repeated question, "What was Chaddock like?" were usually given haltingly, the emotional reaction revealing more of the uniqueness of the man than did the thoughts formulated in reply. But his friends

might agree that Chaddock[2] unconsciously gave expression to their feelings when he wrote in a brief eulogy of one of them, Henderson:

"As I evoke, swiftly, clearly, a multitude of memories I long for the genius of an Ingres to make vivid for others in a portrait the charming personality that takes form and color and life in the gallery of my mind."

While there are many indications that Chaddock led a leisurely existence, he was also either an unusually efficient worker or had accustomed himself to periods of intensive activity. Even his recreational pursuits were cultural ones. In Paris it was his habit to spend late afternoon hours in a café with a companion of similar inclinations, and when not engaged in talk or reflections, he wrote sonnets there. An excerpt from one written in 1909, the year when one of our informants (Ralph Thompson, a St. Louis pathologist) frequently accompanied him, is quoted as typical of what Chaddock might have composed in such a circumstance. It was called *Night has Come:*

> Woven of mem'ry's loom dream tissue is
> Truer mayhap than Truth can ever be
> For Truth all naked doth too often miss
> Her way and take a path bare Truth should flee
> Sweet dreams for Truth a brilliant garment weave
> To clothe her so that e'en in Truth we believe.

Two of Chaddock's favorite Parisian spots were the *Café du Dôme* and the *Café des Deux Magots,* the latter the fountainhead of present-day existentialist activities. It is likely that his friendship with Ramón y Cajal ripened in some such environment. One may imagine that their talk turned at least occasionally to Cajal's research, for as an old man Chaddock could still give page references and quotations from Cajal's classic two-volume anatomy of the nervous system. Chaddock was also a gourmet. Ralph Thompson remembers attending a 1909 dinner which Chaddock gave for Babinski and others of the neurological staff of the Pitié. For that occasion the whole of an obscure restaurant known only to an elect circle of epicures had been reserved. On arrival the proprietor and his family greeted Chaddock effusively, as an esteemed one who favored them occasionally as a guest.

It is likely that Chaddock's epicurean tastes and cultural pursuits fostered the close personal friendship he developed with the

2 *Bull. St. Louis med. Soc.,* June 6, 1927.

brothers Babinski. Its intimacy much exceeded that to be expected between a professor and a one-time American assistant. From the retrospect of Chaddock's later writings, it is evident that Joseph Babinski's clinical philosophy influenced Chaddock profoundly. Babinski had decided upon neurology as a career after a thorough training in internal medicine. He became Charcot's chief of clinic about 1885, and in 1893 (at Charcot's death) took charge of the neurological clinic at the Pitié. Babinski's prime interest was in the living patient, and to it laboratory and autopsy research were subordinated.[3] Chaddock was Babinski's assistant during the period following the latter's first note upon the toe sign, and he became as quick as Babinski to follow up any chance finding in a living patient. An example of this was to come later in his discovery and thorough investigation of the ankle sign.

Henri Babinski, brother of Joseph, is relatively unknown to neurologists. A mining engineer by profession, his hobby was cooking, and he practised the art for Joseph Babinski and his friends. Chaddock was one of those who ate Henri's dishes frequently at the Babinski apartment, and when Henri wrote a cookbook, *Gastronomie Pratique* (referred to by the brothers as *Ali Baba* or simply *Baba*), Chaddock was called upon to interest Americans in it.

Up to the time of his death Chaddock had not given up the notion of translating all of the representative works of Babinski into English. As indicated previously he made a good start in 1914, and it is likely that the difficulties of finding a publisher, and of securing permission after Babinski's death, were the principal deterrents.

Chaddock began to write in 1889 and made many solid contributions to the literature of psychiatry and neurology. In that year he translated a Krafft-Ebing experimental study of hypnotism. Since Chaddock was Krafft-Ebing's principal English translator, a few words about the Austrian psychiatrist are not amiss. Krafft-Ebing was an indefagitable worker who made careful pedigrees of all of his cases. He advanced markedly the anthropologic-clinical study of mental disease introduced by Morel. The small study on hypnotism and *Psychopathia sexualis* were products of his period as professor at the University of Graz, Austria. The latter book brought him both wide recognition and criticism. In 1892 Krafft-Ebing succeeded Meynert as Professor of Psychiatry at Vienna,

[3] Fulton, J. F. Science in the clinic as exemplified by the life and work of Joseph Babinski. *J. nerv. ment. Dis.*, 1933, 77, 121-133.

then the most important psychiatric professorship in the world. After that honors and recognition were showered upon him.

Chaddock's earliest original studies reflected the interests of a state hospital physician of the period. A case report upon primary rheumatic endocarditis with erythema nodosum is mingled with articles of practical psychiatric interest and speculative notes concerning the origin of visual hallucinations. One contribution is selected for mention, for in it Chaddock presents a suggestion for the statistical classification of insanity by dividing the cases into functional, organic, and degenerate groups, and emphasizing the anthropological significance of the latter, a stand which allied him with Morel, Magnan, and Krafft-Ebing, and which later correspondence indicates he did not forsake. Chaddock's translation of Krafft-Ebing's *Psychopathia sexualis*[4] also appeared in 1892 and of Schrenk-Notzing's *Therapeutic suggestion in psychopathia sexualis* in 1895. In the latter year he also published a report of the psychiatric examination of a man, aged twenty-six, who was "indicted for the brutal motiveless murder of his wife and child" and against whom there developed an intense popular prejudice. The records of the trial suggest that the local psychiatric experts divided into two camps. Chaddock, among others, testified for the defense, and his published findings were a model of writing for the forensic psychiatry of that period. An excerpt[5] exemplifies both Chaddock's writing style and the then current concept of paranoia. Correspondence of Chaddock's later years suggests that the term "dementia precox" was inclusive of the degenerate insanity he associated with paranoia.

> Paranoia is the name of a *chronic progressive* mental disease usually manifested in systematized delusions which are of primary origin; that is delusions that do not arise out of preceeding mental depression or exaltation. . . . Study of cases of paranoia shows that there is always a history of mental symptoms which antedate the development of the perfected delusions, and often other symptoms of a vicious constitutional state of the nervous system in general. . . . Since the constitutional defect which underlies paranoia is imperfection in generation and development, paranoia, with other diseases of like origin, is called degenerate. . . . Thus, the deeper the degeneracy, the earlier the mental disease appears, and the more sure and rapid the progress to a condition of permanent mental weakness. . . . Where primary delusions of persecution arise early in life and are of a deeply degenerate foundation, they are apt to change in character, and this change affords a trustworthy indication of the future course of the malady. This change of delusions of persecution is called the *transformation*. This con-

[4] F. A. Davis and Company report that 6,000 copies were printed. It was published by another firm after the copyright had expired.

[5] *J. Amer. med. Ass.*, 1895, *24*, 232-236; also, *Med. Mirror*, 1895, *6*, 62-70.

sists of a change of primary delusions of persecution to delusions of personal aggrandizement. . . . The transformation, whenever it occurs, is a sign that the dementia will ultimately come on, and the earlier it takes place the more rapid the progress to mental weakness will probably be. . . . In paranoia, the logical and associative powers of the mind are not necessarily impaired. Rather mental associations are facilitated as a result of the extraordinary intensity of consciousness characteristic of the disease. This intensity of consciousness of a direct personal kind accounts for the instantaneous mental assimilation of all ideas, no matter how incongruous or contradictory, and the forcing of them into immediate association and logical relationship with the predominating delusions. . . .

In scattered comments then and later Chaddock alluded to the likelihood of an organic substrate for certain cases of dementia precox. Such fell into his category of degeneracy, and he believed they bore a poor prognosis and might show subtle evidence of neurological impairment. In the course of our study we were privileged to examine *HD,* a female patient committed to St. Louis State Hospital forty years before by Chaddock and his contemporaries under the diagnosis of dementia precox (see Fig. 2a). The polykinetic[6] ankle jerk and double wrist signs described in a note signed by Chaddock in August 1913 were no longer in evidence, but there was still a slight tremor of the extended hands. Our brief psychiatric examination gave abundant evidence of schizophrenic thinking; the patient gave her age as eighteen (which it was at her commitment), the year as 1905, and the current president as McKinley.

The years 1895-1905 represented a transition in which Chaddock's writings came gradually to reflect a more exclusively neurological interest. There were two articles for dentists, one upon hysterical manifestations related to facial pain and another upon hypnosis. In 1903, while vacationing in a hamlet near Granville in Normandy, during a rainy period he wrote, without notes or references, an *Outline of Psychiatry* for the medical students of St. Louis University. As an old man Chaddock took considerable pride in certain of the preliminary passages of this small book which concerned the origin of mind. Having later read v.Monakow he believed these early views of his own not too different and considered translating the writings of that author into English. Chaddock's translation of Krafft-Ebing's large *Textbook of Insanity* was published in 1904. At about that time he also produced a

[6] The term was first used by A. Charpontier to describe more than one jerk (yet not amounting to a clonus) in response to a single stimulus. The French school presumed the polykinetic jerk to be an incipient sign of dementia paralytica.

series of chapters on sexual instinct for Peterson and Haines's and Hamilton's texts on legal medicine.

Chaddock's neurological writings actually commenced in 1898 and were constantly influenced by the then current problem of differentiating between the organic and functional manifestations of nervous disease. There was at that time an influential school of thought, particularly dominant in France, which held the sure distinction between them to be impossible. Strong opposition to this notion motivated Babinski in his search for neurological signs which could be evaluated precisely. Throughout his writing of that period Chaddock emphasized the importance of the organic, without, however, neglecting his already developed psychiatric judgment.[7]

"We must not leave the mind out of account, nor can we expect always to reduce disease of the nervous system to anatomical terms."

Several of Chaddock's early neurological communications were the accounts of clinics conducted at City Hospital, St. Louis, then occupying temporary quarters due to damage to the old hospital by the tornado of 1896. The temporary quarters were across the street from Union Station, a site now occupied by a Milles fountain. From comments of visiting physicians of the period, we learn that the small space was so overcrowded that good work was extremely difficult; yet in spite of this Chaddock's case presentations were outstanding.

It was his practice to select one or several cases, not necessarily related, representing problems commonly met with in the general practice of the day. For each he stated succinctly the significant clues to *early* diagnosis. For example, he noted that subtle mental impairment may occur as a precursor of Sydenham's chorea, and that muscular enfeeblement is a feature of that condition. He demonstrated the latter by a case of chorea mollis. As a footnote to the first of these clinics he indicated his orientation as follows:[8]

> In our classic text-books, the opinion of the author is seldom dogmatically expressed, and the stress he may intend to lay on certain points is frequently lost in the mass of citations from authorities and the exposition of various theories. The experienced neurologist works with his practical points, gained in his large sphere of special observation; but when he comes to write he frequently loses his practical positiveness in theoretical indecision. Thus a text-book seldom supplies what experience gives.

[7] *Med. Fortntly*, 1903, *23*, 177-184.
[8] *St. Louis med. Gaz.*, 1898, *2*, 173-175.

It was in this vein, and experiencing the clinical difficulties mentioned above, that Chaddock first emphasized the importance of the Babinski sign to a City Hospital audience in a lecture delivered 6 November 1899, the year following Babinski's account[9] and the same year in which Collier[10] introduced it to the English-speaking world. Chaddock[11] said in part: "The great value of this sign is that it is often possible to discover it when other signs of disease of the pyramidal tract are not yet present, or when they are equivocal. . . . It does not necessarily indicate incurable change in the motor tract, rather disturbance."

This period of Chaddock's writing concludes with two more comprehensive papers upon the reliable neurological signs available for use in the differential diagnosis between organic and functional disease. Each demonstrates clearly the Babinski influence.

In 1911 Chaddock wrote three papers upon the external ankle sign for which his name is now chiefly remembered. The first one was read 20 May 1911 before the St. Louis Neurological Society and published in the *Journal of the Missouri State Medical Association* for that year (*8*, 138-144). Since 1900 Chaddock had been a profound student of the nuances of the Babinski sign, always seeking in *seriatim* examination the earliest deviation from the usual plantar response that suggested subsequent appearance of the overt sign. Among these was a slight inward turning of the foot associated with some dorsiflexion. With Gothard (*Revue Neurologique*, 1902) he had also reported an increased incidence of Babinski's sign brought out through cold stimulation.

Chaddock described the most sensitive area for eliciting his external ankle sign as overlying a slight depression just in front of the lowest point of the external malleolus and behind the tuberosity of the cuboid, noting that the stimulus required varies from rubbing with a blunt eraser to a rather severe scratching with a moderately pointed nail file. The reaction was most often identical with that of the Babinski, but it would seem that Chaddock also accepted flexion of the toes as a response, since that was not observed to occur in normals from stimulation of the inframalleolar

9 Babinski, J. Du phénomène des orteils et de sa valeur semiologique. *Sem. méd.*, 1898, *18*, 321-322.

10 Collier, J. An investigation upon the plantar reflex with reference to the significance of its variations under pathological conditions, including an enquiry into the aetiology of acquired pes cavus. *Brain*, 1899, *22*, 71-99.

11 *Med. Fortntly*, 1900, *17*, 144-150.

skin. Chaddock believed his sign to have the significant advantage of minimizing dorsiflexion of the foot as a withdrawal reaction to noxious stimulation.

When Chaddock first discovered the external malleolar sign he considered it a variant of the Babinski. However, after observing that the relation of ankle to Babinski sign in the same foot was by no means invariable, he began to question that conclusion and set about stimulating the external inframalleolar area first and attempting from that reaction to predict whether or not a Babinski would be found. Head injuries and capsular hemiplegias of vascular etiology formed his principal case material, though a variety of other conditions were also examined. Selected chart notes from 1911-1913 are illustrated in Figure 2. Chaddock[12] said: "A striking peculiarity of the external malleolar sign is the fact that with a unilateral Babinski, it is the rule to find the external malleolar sign on both sides."

Later—in traumatic cases—he observed the relation *in time* between the appearance and disappearance of external malleolar and Babinski signs:[13]

> Elsewhere I have suggested that this phenomenon occuring thus bilaterally is due to interruption of crossed and homolateral motor fibers by a single lesion. This explanation seems to be strengthened by the order of appearance and disappearance of this phenomenon and Babinski's sign: (1) Unilateral external malleolar; (2) Babinski's sign joining it with (3) external malleolar on the other side, then (4) Babinski's sign joining the latter—, in traumatic cases. The reversal is: disappearance of Babinski's sign with the ankle sign first where they last appeared leaving the external malleolar sign first observed persistent for a time, perhaps to disappear or to remain as an indication of slight, though permanent, damage done to the central nervous reflex paths on one side.

For the hemiplegias Chaddock gives a somewhat different picture, noting that in the acute phase the Babinski occurred in the paretic limb with the external ankle sign evident bilaterally. As hemiplegia became established, he observed that either or both the Babinski and ankle sign of the paretic limb might disappear, the ankle sign of the normal limb remaining as a rule (*Interstate Medical Journal,* 1914, *21,* 335).

Chaddock's first description of the wrist sign appeared in the *Interstate Medical Journal* for 1912 (*19,* 127-131) and is supplemented in a later account in the same journal (1914, *21,* 333-340).

12 *Interst. med. J., 18,* 1026-1038.
13 *Ibid.,* footnote 12.

Reasoning by analogy, Chaddock sought a skin area upon the wrist which would correspond to the external inframalleolar skin. He found that scratching the skin to the ulnar side of the palmaris longus and flexor carpi radialis tendons caused a brief contraction of the hypothenar eminence in normals, and the pathological sign to develop in conditions with uni- or bilateral involvement of the

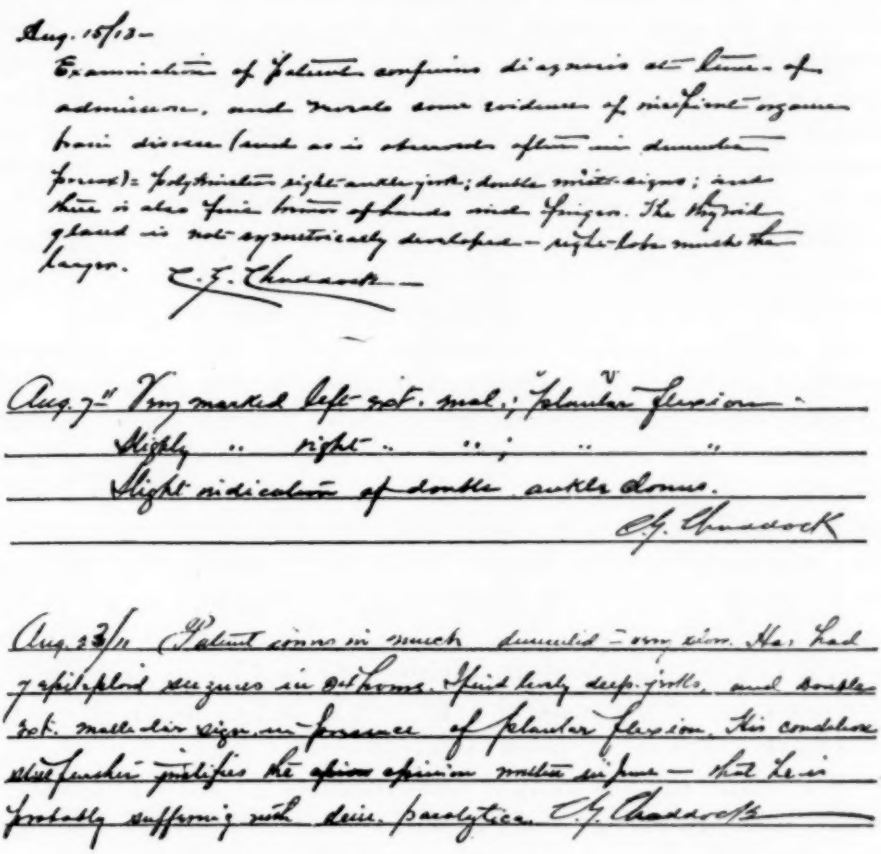

FIG. 2. Three clinical notes from charts of St. Louis State Hospital. The notes were written during the period when Chaddock was investigating the ankle and wrist signs and illustrate his method of recording data.

A, patient *HD*, written Aug. 15, 1913; diagnosis dementia precox. A brief description of this patient as we saw her 40 years later is given in the text.

B, patient *NP*, Aug. 7, 1911. Note selected because autopsy findings became available and Chaddock had recorded the ankle signs as existing bilaterally, that on the left being more marked. There was extensive right unilateral softening in the temporo-parietal area.

C, patient *TG*, Aug. 23, 1911. Not mentioned in the text. Double ankle signs with plantar flexion responses bilaterally in a case of dementia paralytica.

motor paths. *In toto* the latter consisted of active flexion of the wrist, some spreading and extension of the fingers, and approximation of thenar and hypothenar eminences, the latter brought about more particularly by adduction of the base of the thumb (Fig. 3). There was frequently an incident contraction of the mid-part of the triceps.

Lyter,[14] who studied under Chaddock, illustrated the method of eliciting the sign in more detail, stating that the reaction commences with contraction of the flexor carpi radialis muscle and may consist of that alone. As a rule, Lyter says, this is followed by contraction of the thenar and hypothenar muscles and finally by contraction of the entire flexor group producing a distinct flexion of the hand upon the wrist. Chaddock believed that when the pathological wrist sign occurred in association with the isolated ankle sign upon the same side, it indicated a disturbance of the pyramidal tract at some level above the cervical enlargement.

At every opportunity Chaddock studied the combinations between ankle and wrist signs and Babinski. In the 1914 article he inferred that mild unilateral lesions seated above the pyramidal decussation may cause ankle and wrist signs to develop contralateral to the lesion. On the other hand, those more serious lesions which usually but not inevitably cause loss or diminution of voluntary motor power when located above the decussation on one side he believed to induce the Babinski sign contralaterally (with the ankle sign?) and a wrist and ankle sign homolaterally. With bilateral cerebral involvement giving a bilateral sign of Babinski the detection of a unilateral wrist sign is said to locate the more extensive lesion of the motor tract upon that side.

The reader may, as we have done, draw one further implication which is hinted at, but never explicitly stated—that the ankle sign, properly and repetitiously examined for, is the most sensitive indicator of early involvement of the motor path.

Hearsay supplements the published accounts in some particulars. Raeder informs us that in acute subdural hematoma Chaddock might designate exploration of the homolateral side when he observed a single ankle sign and plantar flexion responses bilaterally. Chaddock appeared sometimes to have used the wrist sign similarly, and it is most likely that he always took experential data from previous patients into account, as indicating the prob-

[14] Lyter, J. C. Multiple adenocarcinomata of the brain. *Med. Clin. N. Amer.*, 1924, 7,

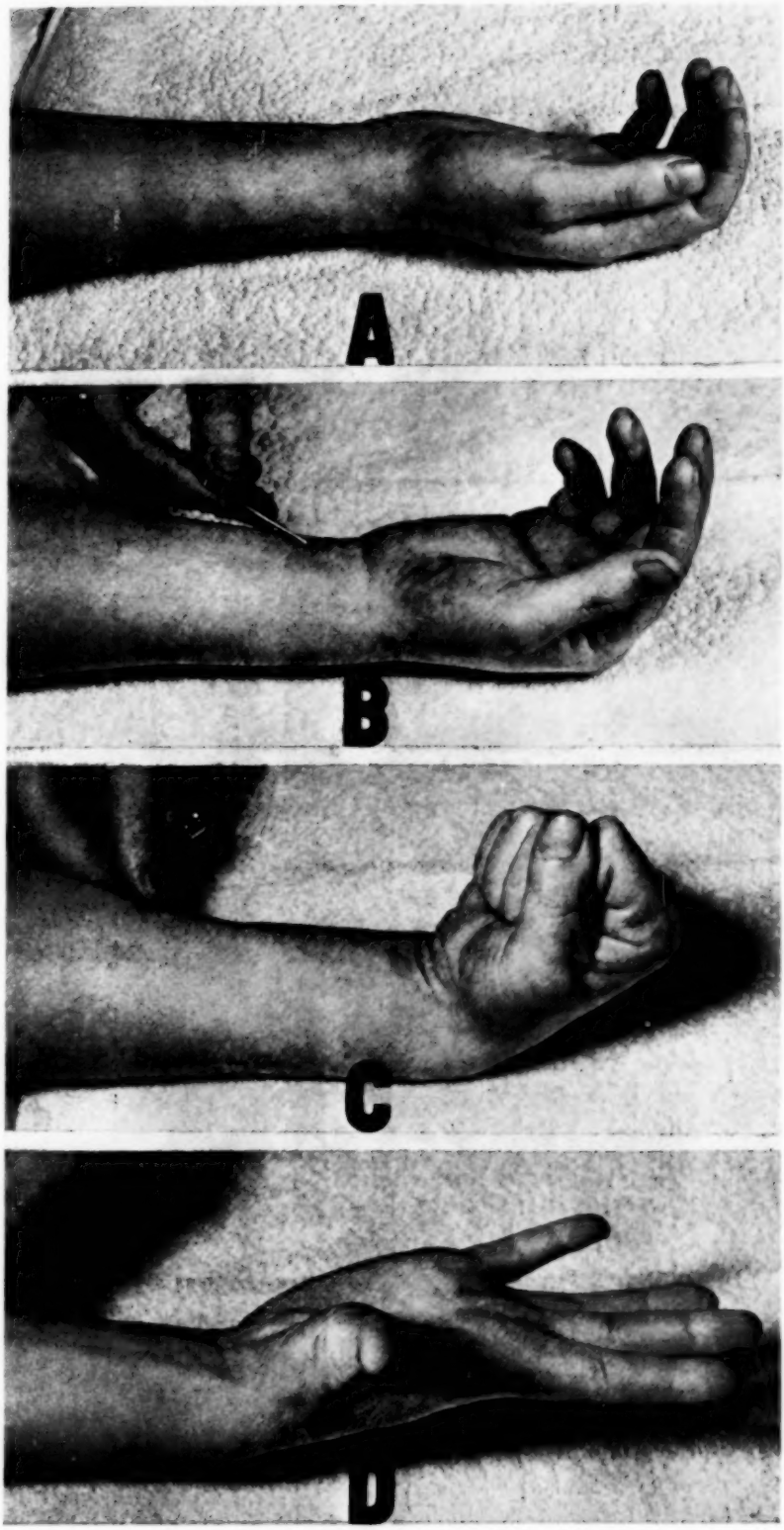

FIG. 3. A strongly positive right wrist sign in a patient with recent frontal contusion. Photographed on the neurosurgical service of Prof. H. G. Schwartz. The left wrist sign was weakly positive. *A*, *B*, and *C* are *seriatim* photographs of the reaction to a single scratch. *A*, hand posture prior to stimulation, and *B*, and *C* as the sign develops. *D* is a single photograph from another scratch to show spreading of the fingers.

able chronology in which the signs would develop if exploration were delayed. Chaddock also had the habit of grading the signs as "slight," "marked," and "very marked" (Fig. 2b), and this item may also have influenced his judgment. In the case *NP* (1911) upon which the note of Figure 2b was written, the autopsy revealed a diffuse softening of the entire right temporo-occipital region, and no evidence of left-sided cerebral pathology was indicated. This would have represented an extensive lesion using the criteria set forth in Chaddock's 1914 paper, and the bilateral ankle signs, more marked upon the left, would have correlated well with the autopsy findings in the case.

Other hearsay indicates that Chaddock had a theory concerning the phylogenetic significance of the combinations between homolateral and contralateral upper and lower extremity signs. He considered the appearance of pathological signs as evidence of a regression to a quadrapedal trotting pattern in which one foreleg was advanced with the opposite hind one. Evidently Chaddock held this theory lightly for he did not mention it in his writings.

The conclusions have been presented in some detail because they represent the discoverer's views upon the important ankle sign and because they have been largely forgotten. The significance of the deductions remains to be established by fresh evaluation; but fewer toe signs would be missed through cursory examination if the neurologist in addition to his interest in his patient's welfare also worked to confirm an hypothesis.

The classical wrist signs which we have observed have been those which accompanied acutely developing and often bilateral lesions; otherwise we have noted them inconstantly and have not formed an opinion concerning their over-all reliability.

In the course of study we have found two items of more general interest which relate to the Chaddock signs. In the autumn of 1911 Chaddock sent to Babinski his papers upon the ankle sign with photographs and other substantiating data. We have read two letters which Chaddock subsequently received from the brothers Babinski, the latter of which from Henri was principally concerned with asking Chaddock's aid in getting some American publicity for his cook book. In a postscript[15] Henri indicates that J. Babinski had been able to confirm Chaddock's findings. To what

[15] "Mon frère me charge de Vous faire savoir qu'il a vérifié Vos observations sur les réflexes. Il trouve Votre travail très intéressant et sera enchanté d'en causer avec Vous quand Vous viendrez à Paris. H.B."

extent, we have been unable to discover since there is no mention of the ankle sign in Babinski's later writings.

The other item concerns Fulton and Keller[16] who carried out extensive experiments to determine the origin of the Babinski sign in the primate series. They had one monkey which exhibited a contralateral Chaddock following hemispherectomy, but they did not observe the Babinski sign below the gibbon. Late Chaddock correspondence indicates that this notice from the young neurophysiologist at Yale gave him considerable satisfaction.

There is nothing to add concerning Chaddock's translations from the selected works of J. Babinski which appeared in the *Interstate Medical Journal* for 1914. These and the other paper discussed above are the last publications we have been able to find until 1936. In that year of his death he published a final paper in the *Journal-Lancet* in which he discussed certain of the less described cutaneous and deep reflexes of the arm and hand. He reverted to the analogies drawn earlier between skin areas of upper and lower extermities and attempted to relate certain of the flexor muscle responses of the hand to the normal plantar of the foot.

Students of Chaddock always noted his diagnostic acumen, and particularly his ability to select those items of accessory examination which led to an etiological diagnosis. In puzzling cases where central nervous system disease reflected systemic involvement, Chaddock, they say, unerringly asked for the procedures neglected by others which confirmed his diagnostic deductions.

It is likely that increasing deafness brought on a gradual lessening of Chaddock's clinical activities after 1914, although to the last he continued to see patients in his home. More and more of his time was devoted to reading, correspondence, the writing of sonnets, and reflective thinking. Chaddock never published the sonnets. A few that we have seen from his later years are tinged with pessimism, and the translation of an Horatian ode to Torquatus (Book IV, Ode VII), evidently undertaken then, also suggests that attitude. His reflective thinking as he found himself "leisurely following the path to the river" often turned, as it had since his youth, to the meaning of an all-pervasive *Truth*. In age, this *Truth* included perhaps the meaning of his own life. One

[16] Fulton, J. F. and Keller, A. D. *The sign of Babinski.* Springfield, Ill., C. C Thomas, 1932, 165 pp.

additional bit of correspondence is quoted in part to exemplify these thoughts:

> We can mean really "something" to but very few; or if one means much to the many what one is is surely not rare but rather common and easy of general acceptance and approval. Perhaps it is a great merit to give a generally visible halo to the commonplace, but it is debatable. Greatness is, unless arrived at in analysis made by a few judges, something that is based on simplicity of spirit, or feeling, or thought.

In his later years Chaddock did continue to pursue his academic interests in neurology. In his correspondence he impressed on us a theory of nerve conduction which he had formulated, but more as an example of his active mind and reflective thinking than for its long-term significance. It concerned the importance of the sheath in the conduction of the nerve impulse and was vaguely reminiscent of the saltatory conduction which today occupies the attention of some of our best electrophysiologists.

One turns with some hesitancy to the problem of evaluating the Chaddock of 1890-1914 for the neuropsychiatrist of today. Psychiatrically the pendulum has swung far, and the writings of Chaddock's time may appear disarmingly simple, static, and therapeutically pessimistic to those who decry organic and physiological interests in mental disease. However, they had the appeal, often missing now, of that common wording which permits meaning to be understood without equivocation. Neurology, too, has changed much, extending and solidifying its neurophysiological base and perfecting the supplementary diagnostic techniques of which only lumbar puncture had arrived in time to be very helpful to Chaddock. The experienced neurologist, however, still works with his "practical points," as Chaddock did in 1900, and is usually appreciative of the past masters who made possible their application. Chaddock's claim to such appreciation rests largely on the reliability of his ankle sign as an early indicator of motor path involvement. Re-examination of the related thesis which he sought to establish may add further to his prestige.[17]

[17] Of the material included, Chaddock's good friends Oscar Raeder, Ralph Thompson, Warren P. Elmer, and Mrs. Gilbert Henderson contributed many of the personal observations. Oscar Raeder lent the two Babinski letters and a sheaf of other correspondence, and his detailed memory of Chaddock's verbal teachings on his signs has been invaluable to us. Mrs. Catherine Morton of St. Louis State Hospital surveyed one thousand old clinical records between 1911 and 1913 searching for Chaddock notes, and to her we are most indebted for having completed that arduous task. W. H. Funderbunk of Traverse City State Hospital covered that source for us. Royall Snow of the Department of English, Ohio State University, contributed a personal letter, and John F. Fulton a late letter from Chaddock to a mutual Minnesota friend, Cottam.

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Antoine Laurent Lavoisier's "Réflexions sur les Effets de l'Ether Vitriolique et de l'Ether Nitreux dans l'Economie Animale"

JOHN F. FULTON,* DENIS I. DUVEEN,** AND HERBERT S. KLICKSTEIN***

THE anesthetic powers of sulfuric ether were first clearly demonstrated on 16 October 1846 when W. T. G. Morton administered the volatile agent to a patient who was to undergo a major surgical operation by Dr. John Collins Warren of the Massachusetts General Hospital in Boston. There were, however, forerunners who not only had described the properties of sulfuric ether, but had experimented with its use, although no one prior to Morton had given a convincing demonstration of its value as a surgical anesthetic.

In this communication we wish to draw attention to a little-known publication on the subject by Antoine Laurent Lavoisier, the great French chemist, which was presented in 1783. In order that the significance of his work may be more readily understood, we should like first to mention in brief the observations of some of Lavoisier's predecessors.

Valerius Cordus, in a section of a book on materia medica (*Annotationes in P. Dioscoridis De medica materia,* Strasburg, 1561) entitled "De artificiosis extractionibus" issued after Cordus' death by Conrad Gesner, tells how in 1540 he had succeeded in synthesizing from sulfuric acid and alcohol a volatile fluid which he named "sweet vitriol." He recommended it for dealing with infections and he evidently also advised its inhalation, since he records that "it draws the pus and mucous from the lung in pleurisy, pneumonia and hacking cough." He adds that it may be taken internally without danger in doses of a few drops mixed in a moderate quantity of wine. Cordus concludes that "because of the tensity of its nature it easily evaporates."[1]

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1 The original text of the ether passage was translated in 1925 by Guy K. Tallmadge (*Isis,* 1925, 7, 394-411). One should also consult Chauncey Leake's more detailed account of Cordus himself (*Isis,* 1925, 7, 14-24).

The synthesis of Cordus was apparently lost sight of and we do not hear again of the use of ether until 1680 when Robert Boyle described sweet vitriol in the second edition of the *Sceptical Chymist*. It is here to be found in an appended tract entitled "Experiments and notes about the producibleness of chymicall principles" (1680, p. 110).

Isaac Newton knew of Boyle's synthesis and relates in his *Opticks* that he not only had made the volatile liquid himself, but had tested its optical characteristics.[2] The name "sulfuric ether" was introduced by a German chemist, Johannes Augustus Sigmundus Frobenius, who had worked as one of Robert Boyle's assistants. When Frobenius published his "An account of a spiritus vini æthereus, together with several experiments tried therewith" in the *Philosophical Transactions* of the Royal Society (1730, *36*, 283), another young German chemist, Ambroise Godfrey Hanckewitz, who described himself as a one-time "operator" in Boyle's chemical laboratory, accused Frobenius of having stolen Boyle's synthesis. He maintained that both he and Frobenius had been making ether and dispensing it before Frobenius's paper appeared. It would seem that both of these contenders had inhaled ether without discovering its anesthetic properties.

When a catalogue commemorating the centennial of surgical anesthesia was being compiled,[3] there came to light an unusual and little-known tract by one Matthew Turner, Surgeon of Liverpool, entitled *An Account of the Extraordinary Fluid called Aether*. It was printed by J. Wilkie of London without date, but internal evidence suggests the year 1743. After alluding to Isaac Newton's and Robert Boyle's synthesis, Turner discusses the details of his own procedure which included "three different kinds of Aether; which, from the Name of the Acid employ'd in making them, are term'd *Marine, Nitrous,* or *Vitriolic.*" He considered *Vitriolic* as the most perfect Aether. Turner stated that ether may be ingested in a dose of two teaspoonfuls mixed with wine, and he also recommended its *inhalation* for the relief of stubborn cases of headache. For this purpose he applied "a bit of Linen Rag, wetted with *æther,* up the Nostrils" and this "must be repeated if the Pain is so urgent as to require it."

It appears unrecognized that Antoine Laurent Lavoisier published any work on ether, particularly as relating to its effect on

[2] *Opticks,* 1706. Bk. III, Question 22, p. 330.

[3] Fulton, J. F. and Stanton, M. E. *The centennial of surgical anesthesia.* An annotated catalogue of books and pamphlets bearing on the early history of surgical anesthesia exhibited at the Yale Medical Library October 1946. New York, 1946. xv, 102 pp.

the animal system. Lavoisier's initial experiments with ether date from 1771 when he first began to study combustion and the calcination of metals. His early studies on combustion, together with a succinct account of the results obtained by some of his predecessors, were published in his *Opuscules Physiques et Chymiques* (Paris, 1774).[4] Here he records (p. 118) that atmospheric air confined in a receiver, acquires the property of precipitating limewater when ether (*l'éther*) is burned in it. The continuance of the experiments on combustion was to provide Lavoisier the basis for his *antiphlogiston* theory, namely, that substances will burn only in pure air, that non-metals, like carbon, sulfur, and phosphorus, produce acids on combustion, that calces are formed by the absorption of oxygen by metals, and that combustion is a chemical combination of the combustible substance with oxygen, not an escape of *phlogiston*. It must be borne in mind, however, that Lavoisier did not give a complete explanation of the phenomenon of combustion; although he clarified the rôle played by oxygen, he could not explain the production of fire, and he introduced the term *caloric* to describe the *élément impondérable*, heat. It is in a paper entitled "De la Combinaison de la Matière du Feu avec fluides évaporables, et sur la formation des fluides élastiques aëriformes" published in the *Mémoires*[5] for 1777 that we again find Lavoisier working with ether in the continuation of his combustion studies especially as applied to the concept of caloric. He here employs ether, among other substances, in a series of experiments on gas formation, advancing the suggestion that all "airs," or elastic fluids, are compounds of liquified volatile solids with material heat, or the matter of fire. This work was later reprinted in some detail in his *Traité Elémentaire de Chimie* (1789) and will be more fully discussed below. Lavoisier also records in the *Traité* (p. 11) some unpublished experiments with ether that he had done with Laplace prior to 1777. They demonstrated with ether that the gaseous state is a modification of bodies dependent on temperature and pressure. Lavoisier again employed ether in an investigation

[4] For full bibliographical details of this and other works of Lavoisier see Denis I. Duveen and Herbert S. Klickstein, *A bibliography of the works of Antoine Laurent Lavoisier, 1743-1794*, with a preface by John F. Fulton [in preparation]. Also consult the *Catalogue of printed works by and memorabilia of Antoine Laurent Lavoisier, 1743-1749 . . . Exhibited at the Grolier Club*, New York, 1952 [prepared by Denis I. Duveen and Herbert S. Klickstein].

[5] *Mém. Acad. R. Sci.*, 1777 (1780), 420-432. Abstracted in *Hist. Acad. R. Sci.*, 1777 (1780), 31-32. A completely rewritten version of this memoir on caloric forms the "Premier Mémoire" in Lavoisier's *Mémoires de chimie* (Paris, 1805). An English and two German translations also appeared from 1782-1785.

which was published in the *Mémoires* for 1780[6] and in which he once again presents a theory that gases are composed of evaporable liquids or volatile solids with the "matter of heat." The experiments with ether in this paper also appeared in the *Traité*.

Lavoisier was then, judging from the above work, familiar with ether, indeed he probably knew more about its physical and chemical properties than any of his predecessors. It is not surprising, therefore, to find him applying his experimental approach and theories to the effect of ether on the animal system, more so because of his increased interest in physiological processes as his theories of the *new chemistry* took form. The summation of Lavoisier's work relating to the effect of sulfuric and nitrous ethers on the animal system was made in a paper, read on 15 September 1783 to the *Société Royale de Médecine*, which subsequently appeared in its *Mémoires* as "Réflexions sur les effets de l'éther vitriolique et de l'éther nitreux dans l'économie animale."[7] This paper is generally unknown and although not strictly an anesthesia item it is of importance in summarizing Lavoisier's work with ether which now seems to be one of the basic contributions to an understanding of its chemical and physical properties made in the eighteenth century. His observations on the oral ingestion of ether are also noteworthy.

Lavoisier notes that the "air inflammable" into which ether is transformed resembles, in its physical properties, marsh gas (methane) and the gas given off by metals when they are dissolved in acids (hydrogen). He observes that this air is neither inflammable nor combustible as long as it remains in a closed vessel and does not even inflame on contact with atmospheric air but forms with it a permanent gas which cannot be condensed into a liquid by low temperatures. Lavoisier remarks that this mixture, however, explodes if brought into contact with an open flame. It is also pointed out that an equally permanent gas is produced by mixing oxygen with ether vapor (2 parts ether vapor, 1 part oxygen) but in this case a much more violent explosion is produced by contact with a naked flame. A similar phenomenon is recorded with nitrous ether (*l'éther nitreux*).

[6] Mémoire sur quelques fluides qu'on peut obtenir dans l'état aériforme, à un degré de chaleur peu supérieur à la température moyenne de la terre," *Mém. Acad. R. Sci.*, 1780 (1784), 334-343. Abstracted in *Hist. Acad. R. Sci.*, 1780 (1784), 26-27. The memoir later appeared in Rozier's *Observations sur la physique*, 1785, vol. 26, 142-148. A slightly abbreviated version is included in the *Mémoires de chimie, 1*, 386-397. German versions also appeared in 1785 and 1786.

[7] *Mém. Soc. R. Méd.*, 1781 (1783), 426-430. Translated into German by H. F. Link and published in 1794 in his continuation of Weigel's *Lavoisier Physikalisch-chemische Schriften*, vol. 5, pp. 131-133.

Lavoisier then points out that the temperatures of volatilization of these substances is lower than that of the body and that, therefore, they must pass into the gaseous state once they have entered it. As the stomach is never entirely free from air, they will mix with that air and form a permanent gas which cannot be condensed at temperatures even much lower than 32° Réaumur. Lavoisier therefore deduces that sulfuric ether, and more especially nitrous ether, is a sure remedy for cleansing the stomach of those mephitic gases which result from digestive fermentation. They should therefore be particularly useful in certain cases of migraine and headaches resulting from poor digestive function.

In the course of the paper Lavoisier also records another peculiarity of ethers which he had noticed and this was the fact than on volatilization they considerably lowered the temperature of their surroundings—a fact, he states, already known to William Cullen and Antoine Baumé. He reasons from this that they should also calm and refresh an overheated stomach, and that this property explains the soothing effect of ether.

He states his conviction that ether would be better administered in repeated small doses rather than one large dose. Should a patient's stomach be filled with fixed air (carbon dioxide), as occurs in intoxication, the first dose of ether to be administered would produce a volume of inflammable air equal to the capacity of the stomach. This would not, however, rid the stomach entirely of mephitic gases as there would still remain a mixture of fixed air and ether gas in about equal proportions and the stomach would only be cleared completely of fixed air after the third or fourth dose.

Lavoisier concludes the paper with the remark that objection may be raised against the internal administration of ether which, after all, only replaces to some degree one gas by another in the patient's stomach. He believes that it is up to physicians to determine whether the ether is more salutary than the gas which it replaces. For the doctors' guidance, however, he points out that the inflammable air resulting from the conversion of ether into gas is slightly soluble in water and aqueous fluids. After the lapse of a certain amount of time, therefore, all etherized gas in the stomach would disappear as a result of becoming dissolved.

As we have already pointed out, Lavoisier presented his experimental work on ether in the *Traité Elémentaire de Chimie,* a book which forms a landmark in the history of science. The work is

divided into three parts and it is in the first part on the formation and decomposition of aëriform fluids, on combustion and the formation of acids, and in Part three on the instruments and operations of chemistry, that the ether material is incorporated. The behavior of ether is employed to illustrate the combinations of caloric and the formation of elastic aëriform fluids. In some five pages (pp. 9-14) the basic experimental facts and results of the 1777 paper,[5] the unpublished investigation with Laplace prior to 1777, and the paper of 1780 are given. Figures to illustrate the apparatus employed in the experiments are included in Plate VII, figs. 16 and 17. Lavoisier reiterates his conclusion that if the atmospheric pressure were reduced, ether would always exist as a gas; in fact, ether is almost at the critical point between gas and liquid at the usual atmospheric pressure. He points out that the formation of ether would consequently be impossible upon mountains of a moderate degree of elevation since it would be converted into a gas immediately upon formation; refrigeration and compression would have to be used under these circumstances. Although Lavoisier does not refer to his paper presented to the *Société Royale de Médecine* in the *Traité,* he does conclude with the observation that the temperature of blood is sufficiently high to convert ether to a gas and it is very probable that the medical properties of this fluid depend primarily upon its mechanical effect.

Section VI of Part III of the *Traité* is devoted to the combustion of ether (pp. 449-477). Plate XII, figure 8 and Plate XI illustrate the apparatus used.

In the *Traité* Lavoisier uses the term *éther sulfurique;* the name is so listed in the earlier published *Méthode de Nomenclature chimique* (Paris, 1787, p. 171), thus becoming its official designation in the nomenclature of the new chemistry.

We have shown then that Lavoisier was experimenting with ether as early as 1777 in the course of his work on combustion and that he continued to utilize it in subsequent investigations as well. His avid interest in body processes led him to postulate the action of ether on oral ingestion and in "animal economy" in general. Lavoisier had unquestionably characterized the physical and chemical properties of ether more scientifically and accurately than any of his forerunners. Although he made no contribution to inhalation anesthesia directly, he may have eventually investigated the respiratory effect of ether. Respiration was of prime interest to Lavoisier when he met his untimely death in 1794.

Notes and Queries

Edited by Ralph H. Major, M.D.,* and Dorothy M. Schullian, Ph.D.**

William Hewson, the Hunters, and Benjamin Franklin

Although William Hewson's association with the Hunters, his disputes with William Hunter and Monro *secundus*, and his friendship with Benjamin Franklin are recorded at some length,[1] details remain to be filled in and documents of interest have never seen the light. More than a century ago, Gulliver printed an interesting letter from Benjamin Franklin to William Hunter, giving an account of the terms of agreement between Hunter and Hewson, the quarrel over anatomical preparations, and the part which Franklin played in conveying a number of preparations from the elder to the younger disputant when their partnership had been dissolved.[2] The letter begins with an apology for delay in answering Hunter's questions. "In the Confusion of my Papers, occasioned by removing to another House, I could not readily find the Memorandums I had made during the unpleasant Time in which, as a common Friend, I was obliged to hear your & Mr. Hewson's mutual Complaints." Having located one of these records, dated 23 August 1771, Franklin quoted it in his letter. Another memorandum, without date, listing Hunter's complaints of his assistant, Hewson, has been found among the Franklin papers in the possession of the American Philosophical Society.[3] In the British Museum (Natural History) the writer has come across a few scrawls and jottings in which John Hunter angrily recorded his opinion of Hewson sometime during the short period (1772-1774) which the younger man survived after setting up his own school.

One should not, of course, form any fixed conception of Hewson on the basis of these records alone. Since the matter has already been investigated with some care, it does not seem worth while to provide an elaborate setting for the documents, which do no more than supplement what has long been understood. The reader is reminded, however, that even in an age which seemed to relish such quarrels more candidly than our own, both of

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1 The standard biography of Hewson is prefixed to his collected writings, published by the Sydenham Society. *The Works of William Hewson, F.R.S.*, ed. George Gulliver. London, 1846, xiii-xlviii. Cf. Bailey, G. H. William Hewson, F.R.S. (1739-1774): An account of his life and work. *Ann. med. Hist.* 1923, *5*, 209-224.

2 *Works of William Hewson*, xvii-xviii. Dated 30 October 1772. The existence of this letter in the Hunter Baillie collection, Royal College of Surgeons of England (H.B. I, 126) was mentioned by R. Hingston Fox, *William Hunter . . . with notices of his friends Cullen, Smellie, Fothergill and Baillie*. London, 1901, 8. Mr. W. R. LeFanu, Librarian of the Royal College of Surgeons, has very kindly supplied me with a transcript and photostat.

3 I learned about this memorandum from my friend, Professor Whitfield J. Bell Jr., of Dickinson College, who kindly procured a photostat for me. For courteous correspondence on this subject I am indebted to Mr. W. E. Lingelbach, Librarian of the American Philosophical Society, and Dr. George W. Corner.

the Hunters were remarkable for their thorny tempers and their jealous defence of what they conceived to be their rights. It is well known that the brothers themselves quarrelled bitterly. Monro, Pott, and a number of others were also subjected to their verbal fire. Both were intransigent in argument and often far from temperate in language. It should also be recalled that the rift between the elder Hunter and Hewson was in course of time patched up, at least partially, through the wisdom and kind offices of Franklin, and that ultimately the great teacher of anatomy spoke well of his distinguished pupil. Franklin himself kept an engraved portrait of Hewson in his study, indicating his respect and affection for the talented young anatomist and physiologist, whose tragic death at an early age was a sad loss to British science. Since they tell only one side of the story, the documents quoted below should be accepted with reserve.

(A) Benjamin Franklin's record of William Hunter's complaints of William Hewson. Benjamin Vaughan Papers, American Philosophical Society.

Complaints

That he gave Leave to go to Blenheim ["once" inserted above], but not repeatedly, not for an Absence of 10 Days from Business, which was the more inconvenient as Dr H. was then indispos'd with a Lax

That Dr H. has not only suffer'd this Loss of Mr H's Time & Assistance but by his Management has lost a Friend, Mr B.

That Mr H. would have used a Body of Dr Hunter's Purchasing to make a Skeleton, who it could not be expected should purchase Bodies for him for such purposes

That he had employ'd a Man to pick Bones out of the Tubs & fit up a Skeleton for him, without Leave of Dr H. which ought not to have been done till the Lectures were over

That Mr H's Behaviour to Dr H. was extremely rude, and that he had said, *he was a Fool to expect that Dr H would act like a Gentleman*

That for this Reason he ["Dr H." inserted above] must now come to a dead Stand, and insist on a specific & exact Compliance with the Articles; that Mr H. should expect nothing from him for the future but what those intitled him to; that however this Resolution should have no retrospect:— That he had endeavoured to serve Mr H. who had turn'd that Endeavour to his Prejudice: He could therefore no longer be his Friend, tho' he should not be his Enemy—

That he had taken a Guinea of two Dissecting Pupils who had not been attended for Dr H. contrary to his express Declaration that he would have nothing

That Mr H complain'd of being prevented giving half the Lectures. But Dr H. knowing his Dislike to giving such as required much Speaking, had given those to favour Mr H. That he had offered to leave it to the free Choice of the Pupils, wch Mr H. had declined. That he had refused to give one wch Dr H. had requested him to give. That Dr H. should not have given so many, but that he had been inform'd the Pupils were not so well satisfied with Mr H.'s Lecturing, at least on some Points

Dr H. began by saying I had got into an unpleasant Situation that of hearing the Complaints of two Persons who could not agree; that he was sorry to give me the Trouble of hearing his, but it was in some degree

necessary as he suppos'd I heard the others.—At the Conclusion I told him I should think [replacing "thought," deleted] it no Trouble to hear their Compts. if I could be of the least Use in accommodating their Differences; but since that was not likely, I could only wish as I had a Regard for both, that they would go on to the End of their Term as quietly as possible, since that would be most to the Credit of both. That I had given and should give this Advice to Mr H. which I hoped he would follow

Some other Particulars of Comps were mention'd, such as Mr H's calling the House his, & threatening to break into it.—Proposing to *make Preparations* of two Fetus Heads which Dr H had *already prepar'd*.

The Lectures were of little importance now to Dr H. But he had built a House for them, & must either continue them or lose the Expence, unless he let the House.—I thought he was about to intimate, that if Mr H had behav'd well, he might have let it to him, but he did not go so far.

(B) John Hunter's complaints of William Hewson. Coll. Sherborn. Ex. Litt. Ricardi Owen. Don. R. S. Owen. Owen Correspondence, vol. XV, 470. British Museum (Natural History). In Hunter's hand.[4]

["Now" cancelled] let us see what this mighty Hewson has done. He was first educated under Dr Hr. Under him he discovered the absorbing system in Fish; but [illegible] Dr H having any or the least colateral merit in that discovery ["but" cancelled, "and" inserted] that it was wholey Mr H ["Let us consider" inserted, "then" cancelled] let us examine his Merits. ["over ('while')" inserted] While with Dr H. he publis[h]'d ["my discovery of" inserted] the absorbing system in the Fowl and amphibia[n]s of finding out the Lacts in the one ["after the Lymphatics had been discovered" inserted] and my not having published my discovy in ["the other" cancelled, "either" inserted] gave him a title to do so. and afterward publish'd *his* discovery this System in Fish ["but" cancelled, "back" inserted.] He separated from Dr H—; but that neither added to nor diminished his Merits as an anatomist. Soon after the seperation he publish'd his general account of the absorbents, in which he publish'd all that know[l]edge he had got from Dr H. was there any great Merit in this? for if Dr H had published on this System with the drawings of his preparations, it would have superceeded Mr Hewsons, as he could have had but little ["addition of his own" inserted] to say ["on this subject" inserted] therefore whatever Merit Mr H. may have derived from this publication, should not in strict justice have been given him, and when consider'd in another view should go against him as a Plageerist. He afterwards published his observations on the Blood, on which he built a Theory. The observations themselves are disputed by other observers, and the Theory (whether the obser[vations] are true or false) is not adopted by any one of common sense conversant in Phisiology. Now from his publications let us see what Merit is due to him. First he published what was not his own Second he published what was [not] his own. Third he published wt was not his own. Fourth he published what is disputed or denyed and Fifth he published nonsence [.]

[4] C. D. Sherborn (1861-1942), author of the *Index animalium*, worked with R. S. Owen on the latter's biography of his grandfather, Richard Owen, and was afterwards given the Owen papers which are found in the Sherborn Collection. This letter or memorandum is confusedly written, with many cancellations and insertions. I believe that the following scheme for reading it gives the proper sequence: (1) Read the first page as far as "over ('while')"; (2) third page down to "back"; (3) first page from the point of breaking off; continue to the bottom of the second page; (4) skip to the bottom of the third page and continue to the end, four pages in all.

The impression seems to be a general one that the anatomical preparations forming a principal subject of contention between the elder Hunter and Hewson were at last conveyed to Hewson through the agency of Franklin, a view supported by the Franklin letter of October, 1772. John H. Teacher tells it somewhat differently. "After the settlement of the dispute Hunter handed over a number of preparations to Hewson, and possibly some of them came back among those that he bought when Hewson's collection, along with that of Magnus Falconar, was sold in 1778; but most of Hewson's preparations now in the museum never left it."[5] The biography in Gulliver's edition of Hewson's *Works* gives no other reason for the quarrel than this, but Franklin's notes indicate several causes of friction;[6] it is likely that the question of property in these specimens only became acute when a separation had already been decided upon. According to Teacher (*loc. cit.*) "most of the beautiful preparations of the lymphatics in the turtle and fishes, which now form a large part of Series 12, *Anatomy of the Lymphatic System,* are undoubtedly the work of Hewson's hands."

As to the charge of plagiarism, it should be noted first of all that Hewson's papers on the "absorbents" in birds, reptiles, and fish were presented to the Royal Society by William Hunter himself in 1768 and 1769. If he had considered himself ill done by in Hewson's later publications, Dr. Hunter certainly would have said so; he was never shy of controversy and he needed little help from anyone (although he probably received some literary aid from Smollett) in his paper wars. Benjamin Rush, in his "Travels Through Life," left this record: "It was while I was dissecting a body by his side that Dr. Hewson succeeded in an experiment which proved the existence of lymphatic vessels in Fishes."[7] John Hunter's discovery of lymphatics in the necks of birds was adequately acknowledged by Hewson,[8] although Hunter suspected even before Hewson's dissections were complete that an attempt to steal credit would be made; Hunter was at particular pains to impress upon Hewson at the time that he had also prior claim to the discovery of both lymphatics and lacteals in the crocodile.[9]

Sir Everard Home, involved years later with Blake in a quarrel over priority, expressed his willingness to make every allowance for the violence

[5] Teacher, John H. *Catalogue of the anatomical and pathological preparations of Dr. William Hunter in the Hunterian Museum, University of Glasgow.* Glasgow, 1900, I, xliii. Franklin's letter does not indicate how many specimens he transmitted to Hewson.

[6] Another suggestion has been advanced which strikes me as rather far-fetched. Cf. Garrison, Fielding H. *An introduction to the history of medicine.* 4th ed., Philadelphia, 1929, p. 324: "When his pupil married, William Hunter, who seems to have had a natural aversion to Benedicts, abruptly broke off the partnership."

[7] *The autobiography of Benjamin Rush,* ed. George W. Corner. Princeton, 1948, 52-53. Dr. Corner dates Hewson's observations on the lymphatics of fish between Oct. 3 and Dec. 3, 1768. In Hewson's *Works,* xxii, Gulliver remarks that "the lacteals of fish were observed above a century before by Thomas Bartholin," referring to *De lacteis thoracicis,* London, 1652, 70. I do not have this at hand but have located the passage in the English translation, *The anatomical history of Thomas Bartholinus . . . concerning the lacteal veins of the thorax. . . .* London, 1653, p. 87.

[8] *Works,* 102 (n.2), 145 (n.1).

[9] Hunter, John. *Essays and observations,* ed. Richard Owen. London, 1861, II, 334-335.

of Blake's attack, "knowing, as I have done, from a very early period of my life, the irritability of mind, which belongs to those who are candidates for making discoveries."[10]

The Monro-Hewson controversy was said by a medical journalist of the eighteen-twenties "to have excited more interest than the subject of discovery; for, instead of its being followed up by the investigations of succeeding anatomists into the anatomical disposition of the absorbent system in other animals than those in which its presence had been ascertained and described by Monro and Hewson, so entirely did the interest cease and the matter fall into abeyance, that a physiologist of the present day has raised a question whether there was any truth in the discovery at all."[11] This physiologist was Magendie.[12] The careful investigations of Fohmann were pitted against those of Magendie, and it increases our respect for the British work of the eighteenth century to see what extraordinary difficulty was experienced by the Heidelberg anatomist in demonstrating the *Saugader-system* in fish.[13]

John Hunter was unable to value at their true worth Hewson's studies of the blood, which now constitute his chief claim to attention, no doubt because they did not altogether accord with Hunterian doctrines in a domain which Hunter regarded as his own preserve; also, perhaps, because they depended in part on microscopic observations, of which Hunter, no microscopist, was always doubtful and often a little scornful.[14]

LLOYD G. STEVENSON

[10] Home, Sir Everard. *Lectures on comparative anatomy*. London, 1814, I, 198.

[11] *The Monthly Journal of Foreign Medicine*, conducted by Squire Littell, Jr., M.D., vol. 1 (Jan.-June, 1828), p. 170. This article was reprinted in Philadelphia from *The London Medical and Physical Journal*.

[12] Cf. Olmsted, J. M. D. *François Magendie*. New York, 1944, pp. 38-40, 78.

[13] This statement is based on the article cited above (n. 11). For Hewson's account of his difficulties, see his *Works*, 151-152. Vincenz Fohmann (1794-1837) is the author of several works, listed in the Surgeon-General's Catalogue, on the anatomy and physiology of the lymphatics and blood vessels. These I have not seen. His studies of the vascular supply of the skin are favorably mentioned in Neuburger and Pagel, *Handbuch der Geschichte der Medizin*, III, Jena, 1905, 429. Probably the best review of the extensive later work, Fohmann's included, is that by Burkard Eble in his history of theoretical medicine from 1800 to 1825, continuing Sprengel's *Versuch einer pragmatischen Geschichte der Arzneikunde*, 6 Th., Vienna, 1837, pp. 445 ff., 482 ff. With some exceptions this survey shows lessening reliance on comparative anatomy. An extended account of "absorption," with a full bibliography, is to be found in J. Bostock's article in *The cyclopædia of anatomy and physiology*, ed. by Robert B. Todd. London, 1835-1836, I, 20-35. Cf. also Adelon's review in *Dictionnaire de médecine*. Paris, 1821, I, 113-154.

[14] Cf. Gloyne, S. Roodhouse, *John Hunter*. Edinburgh, 1950, p. 81. The date of Hunter's manuscript diatribe is uncertain, but it seems to have been written while Hewson was still alive. Hewson's *Properties of the blood* appeared in 1772, but his *Description of the red particles of the blood*, 1777, was put together after his death by Magnus Falconar, and only the first chapter, read before the Royal Society and previously published in the *Philosophical Transactions* in 1773, was actually written by him. Here he observed that "as some dexterity and practice are required in the use of that instrument, there have not been wanting men of character and ingenuity, who, having been unsuccessful in their own experiments, have questioned the validity of those made more fortunately by others. Some have gone so far as to assert that no credit can be given to microscopes; that they deceive us, by representing objects different from what they really are." *Works*, 213. Hewson himself preferred the simple, or single, to the compound microscope.

A Colored Vesalian 'Epitome' in Contemporary Vellum

Mr. Milo Keynes, son of the eminent bibliographer, has discovered that the Library of the Antomy School at Cambridge possesses a fine copy of Vesalius' 1543 *Fabrica,* measuring 27.2 by 40.3 cm., as well as a Geminus *Compendiosa* (London, 1545) measuring 27.3 by 39.6 cm. Mr. Keynes' principal discovery, however, is a copy of the first edition of the *Epitome* which is not recorded in Dr. Cushing's *Biobibliography of Vesalius.* Mr. Milo Keynes has gone to the trouble of supplying the following excellent description set out in his father's best bibliographical tradition.

VI.B.-1

EPITOME 1st ed. *Basel,* June 1543

Collation: Large fol. A-M^{1}, [N-O^{1}] lacking; two blank fly-leaves at beginning and end.

Note: Although sigs. [N] and [O] are not present as such, the figures from the recto of each have been cut out, colored, stuck onto parchment (which has gothic lettering on it), and are lying superimposed and loose on figure in *Ma.* These superimposed parts have been attached to the page above the figure *Ma. Gb* has hip bone superimposed on it— partially stuck in position. Frontispiece, plates, portrait, and capital letters have been colored contemporaneously.

Copy used: University of Cambridge Anatomy School, formerly in the possession of Professor A. McAlister. It is on crisp paper and the pages measure 55.4 by 37.2 cm. It is in the original vellum binding, dog-eared at one corner. On one of the flyleaves is the figure £1.1.0.

The *Journal* welcomes bibliographical data of this sort since the Editors hope to foster "the noble art of describing useful and beautiful books."

Linacre and Aldus

Osler in his "Thomas Linacre," 1908, pp. 12-13, cites Payne as pointing out that in the Aldine *editio princeps* of Aristotle there is an allusion to Linacre as having something to do with that great work. "From the dates at which these volumes were issued, 1495-1497 [*recte* 1495-8], it is quite possible Linacre may have been at the time resident in Venice." The allusion occurs in the preface to the third volume, February 1497, where Aldus enumerates the scholars who can bear witness to his own thorough editing, "especially here in Venice Thomas the Englishman" (*praecipue Venetiis Thomas Anglicus*), with enough praise of his scholarship to identify him.

As far as I know it has not hitherto been noted in print that Asulanus in the prefatory letter of the fifth volume of the Aldine Galen, 1525, says definitely that Linacre lived for some years in close association or under the same roof with Aldus (*Thomas Linacrus Aldi nostri contubernio ad aliquot annos usus,* "contubernium" being originally a military term for the sharing of a tent). One may perhaps infer that the great Italian picked the brains of

his English friend more extensively than he acknowledges. Flattery for the patron, yes, but in the old days it was not the fashion for author or editor to load his preface with gratitude to his unremunerative helpers.

W. W. FRANCIS

Note from a Book Catalogue

In the Winter 1952 issue of this *Journal* we published Professor Anthony Pelzer Wagener's translation of the Latin oration at the College of William and Mary of Dr. Jean-François Coste, Chief Physician of the French Expeditionary Force which had arrived in this country in July of 1780. The copy which was used in making the translation had been presented to the Library of the College of William and Mary by the Librarian of Harvard University since Harvard possessed two copies of the address. When Dr. Wyndham B. Blanton sent in Professor Wagener's manuscript, he wrote that there were only two or three known copies of the address. Its rarity is further attested to by the price that has been put on a copy which has just been quoted in a catalogue of Americana.

"COSTE (Jean Francois)—Oratio Habita in Capitolio Gulielmopolitano In Comitiis Universitatis Virginiae, Die XII Junii M.DCC.LXXXII . . . Leyden 1783. First edition, 8vo., Half morocco,
Sabin 5-17021 $120.00

"*Coste, Surgeon General of the French forces in America during the Revolution, received an honorary degree from William and Mary. On that occasion he put forth the thesis that the basic principles of medicine were just as applicable to the New World as to the Old."

E. H. T.

H. P. G. Bayon

We regret to record the death on 20 October 1952 of Dr. H. P. G. Bayon, Harvey scholar, linguist, and medical historian. Attention is directed to Professor Charles Singer's appreciation in the *British Medical Journal* for 6 December 1952 (page 1260). There he records that Dr. Bayon was born Enrico Pietro Bayon in 1856 at Genoa where his father was in the Swiss consular service. He received his early education at Genoa and later at a school directed by the Society of Friends at Sidcup, his mother being an English Quaker. He studied engineering at Genoa and medicine at Würzburg where he took his degree in 1902. He then worked for several years as assistant in pathology at the University of Geneva. After achieving complete facility in Italian, German, and French, he went to London in 1905 and enrolled in a course at the London School of Tropical Medicine. He was a member of the Sleeping Sickness Commission in Uganda (1907-1910) and spent some few years in South Africa as research bacteriologist, taking special interest in leprosy. He served as surgeon with the Red Cross in the first World War and subsequently he settled again in Cambridge, working in pathology at the Molteno Animal Institute. He received the Ph.D. degree

at Cambridge in 1938. His five papers on William Harvey which appeared in the *Annals of Science* (1938-1939) are an interesting example of his remarkable contributions to the history of medicine.

Professor Walter v. Brunn

The *Journal* records with regret the death on 21 December 1952 of Dr. Walter v. Brunn, Emeritus Professor of the History of Medicine and formerly Director of the Karl Sudhoff-Institut für Geschichte der Medizin und der Naturwissenschaften at the University of Leipzig. Professor v. Brunn, the son of the distinguished anatomist, Albert V. Brunn (1849-1895), was born at Göttingen on 2 September 1876. He was educated at Göttingen and later studied medicine at Rostock. A surgeon by training, he early became interested in the history of medicine and in 1919, under Sudhoff's direction, published a monograph on Guy de Chauliac and surgery in the Middle Ages (*Die Stellung Guy de Chauliacs in der Chirurgie des Mittelalters*). Following the departure of Dr. Henry E. Sigerist, Dr. v. Brunn was appointed to succeed him in 1934, and in 1938 he was named Director of the Institut which now carries the official title indicated above. He held this chair from 1934 until 1950 when he retired. Dr. v. Brunn was not as widely known as his two predecessors, but he was a scholarly man, endowed with many gracious human qualities.

Scandinavia

Through the kindness of Dr. Edv. Gotfredsen of the Medical Historical Museum at the University of Copenhagen we received the following items from Scandinavia:

Dr. Wolfram Kock was appointed lecturer on the history of medicine at the Karolinske Institutet, Stockholm, on 1 April 1953. Dr. Kock (born 1913) was educated as a surgeon and has for many years been highly interested in the history of medicine. He has written a number of articles on various medico-historical topics, and has recently published a large work on the history of the "Seraphimerlazarett" in Stockholm, the oldest hospital in Scandinavia, founded in 1752 and still in use.

The two hundredth anniversary of the "Seraphimerlazarett" was celebrated on 30 October 1952. An audience of some 1,500 persons was present in the town hall to hear the anniversary address given by the director of the old hospital, Dr. med. h. c. Karl Wistrand. Representatives from the Scandinavian universities read short congratulatory addresses. The Swedish king, being at the time on travel in Italy, was represented by H.R.H. Prince Bertil. The Prime Minister and the Minister of Education were also present. In the old hospital Professor Jan Strömbeck and co-workers had arranged a very fine exhibition of old surgical instruments. It is intended to make this exhibition a permanent medico-historical museum and a circle called "The Friends of the Medico-Historical Museum" has been formed in order to support these plans.

Dr. George W. Corner of Johns Hopkins University recently visited Copenhagen to give a series of lectures before various Danish societies. On 15 April 1953 he read an historical paper on "The Discovery of Lymphatics" to the members of the Danish Society of the History of Medicine. The address, which gave a full survey of the further development of the discovery made in the seventeenth century by Olof Rudbeck and Thomas Bartholin, was enthusiastically received.

Fellowship Appointments at Johns Hopkins

The Institute of the History of Medicine, of the Johns Hopkins University, announces the continuation in 1953-54 of its fellowships in the history of medicine and of the natural sciences. Fellowships for this year have been awarded to Dr. Herbert S. Klickstein, of the Graduate Hospital, the University of Pennsylvania, and to Mr. Robert P. Multhauf, graduate student in history at the University of California.

Appointment of I. Bernard Cohen at Harvard

The *Journal* is pleased to report the appointment of Dr. I. Bernard Cohen as Associate Professor of General Education and the History of Science at Harvard University. The appointment goes into effect on 1 July 1954. At Harvard the Ph.D. degree in the History of Science is awarded by the Committee on Higher Degrees in the History of Science and Learning, which has been empowered to supervise this degree since 1936. Beginning 1 July 1953 Professor Cohen will be Chairman of this Committee, the membership of which is composed of Professor Cohen, Professors Crane Brinton, Wang Hao, Arthur M. Schlesinger, Sr., Arthur Darby Nock, Philippe Le Corbeiller, Werner Jaeger, and Philipp Frank. There will, therefore, be no break in the continuity in the awarding of the Ph.D. in the History of Science at Harvard.

Administrative Change at the Library of the College of Physicians of Philadelphia

All interested in promoting interest in the history of medicine will be heartened by the news that the College of Physicians of Philadelphia has appointed Mr. W. B. McDaniel, 2d, to the Curatorship of the Library's Historical Collections. Mr. McDaniel will devote his entire time (aside from editing the College's *Transactions and Studies*) to developing the historical aspects of the Library's services. Mr. Elliott H. Morse, formerly Administrative Associate Librarian, was appointed Librarian, effective 1 June 1953, in Mr. McDaniel's place.

Dr. Fulton Made a Fellow of the R.C.P.

On 14 May 1953 Dr. John F. Fulton was made a Fellow of the Royal College of Physicians in London under a special Bye-law which permits admission, without examination, of several persons each year for contributions to medical science.

Historical Gleanings

The Journal of the Michigan State Medical Society for February, 1953, took the form of a Beaumont Memorial Number. For some ten years the Society has been active in promoting the Beaumont Memorial Restoration on Mackinac Island. The old "Earley House" there has been acquired from some nineteen heirs through the courtesy of Parke, Davis & Co. In the basement of this house, which was on 6 June 1822 the retail store of the American Fur Company, Alexis St. Martin received his historic wound. Contributions from Michigan physicians will restore the house to its earlier form. On completion the Memorial will be given to the Mackinac Island State Park Commission for preservation as a shrine of vital significance to American and world medicine. The memorial number of the *Journal* contains articles by Dr. Alfred H. Whittaker of Detroit, Chairman of the Restoration Committee; by Dr. Otto A. Beck of Birmingham, Chairman of the Restoration Fund; by Dr. W. S. Jones of Menominee, Chairman of the Working Committee; and by W. F. Doyle, Chairman of the Mackinac Island State Park Commission. There is in addition an informative description and history of the Beaumont House by Prof. Emil Lorch of Ann Arbor, architectural consultant to the Commission. Finally, Robert G. Wilder discusses Dean Cornwell's work on the famous painting of Beaumont and St. Martin which was presented by Wyeth Incorporated to the Michigan State Medical Society on 23 September 1952. The painting is reproduced on the cover of the memorial number and will be given a place of honor in the Memorial itself.

The issue of *Life Magazine* for 20 April 1953 contained forty-two portraits of notable Americans selected from a list compiled for the new *Encyclopedia of American History* which was recently published by Harper & Bros. Included are Dr. William Beaumont and Dr. W. T. G. Morton.

On 4 March 1953 at the Royal Society of Medicine, Section of History of Medicine, Sir Gerald Kelly presented a paper entitled "The value and significance of representational painting, especially in regard to history." On 3 June Dr. J. Zelmanowits spoke on "A Historical Note on the Simple Dementing Form of Schizophrenia," and Dr. Henry J. John on "Jan Evangelista Purkinje, Czech Scientist and Patriot (1787-1869)."

Joseph Priestley's experiments with oxygen were heralded in *The New York Times* for 5 May 1953 in an almost full-page advertisement on chlorophyll derivatives by the American Chlorophyll Division, Strong Cobb & Co., Inc.

Medical history appears in other guises in *The New York Times*. The shipping page for 13 March 1953 carried a report on the late arrival of the *Queen Mary*, which had been delayed by Channel fog and North Atlantic storms. Immediately below was a space-filler of five lines which informed the no doubt startled reader that Anthony von Iffland, a Quebec

physician, founded the first anatomical school in Canada, at Quebec, in 1820. Other fillers on the same page gave the area of Glacier Park, the height of the Pyramid of Cheops, and, to return to England, the length of Big Ben's minute hand.

From 19 to 25 July 1953 the Second Brazilian Congress of the History of Medicine will be in session at Recife-Pernambuco. Dr. Leduar de Assis Rocha is chairman of the organizing committee. He may be addressed at Rua Carlos Gomes 597, Prado, Recife-Pernambuco.

The Third Circular, February, 1953, of the Seventh International Congress for the History of Science has been received in this country. The congress will meet in Jerusalem from 4 to 11 August 1953. Professor F. S. Bodenheimer of the Hebrew University has done the organizing work. One section will be devoted to the history of medicine, with papers scheduled from Israel, The Netherlands, Denmark, Italy, Yugoslavia, France, the United States, Hungary, India, Switzerland, and Mexico. Professor George Sarton will give the presidential address for the International Union for the History of Science; his topic will be "Science versus the Humanities. The History of Science."

On 23 April 1953 in the lounge of the Los Angeles County Medical Association Mrs. Stafford Warren delivered the Thirteenth Dock Lecture of the Barlow Society for the History of Medicine. Her subject was "Medical Personalities in Pueblo and City Los Angeles, 1843-1909."

An item by Dr. Benno Juhn of London in the *Wiener Medizinische Wochenschrift,* Vol. 103 (1953), pp. 244-245 heralds the hundredth anniversary of the injection syringe.

On 9 May 1953, in Brussels, the following papers were delivered before the Comité Belge d'Histoire des Sciences: "Prescriptions médicales pharaoniques sur ostraca," by Dr. Frans Jonckheere; "L'officiat de santé," by Dr. Henri De Waele; "Origines françaises de la Faculté de Médecine de Liége," by Dr. Marcel Florkin.

St. Bartholomew's Hospital Journal, vol. 57, for May 1953, carries on pp. 114-115 reviews of John Keevil's *Hamey the Stranger* and John L. Thornton's *John Abernethy.* Reference is made to the statement of Professor Ross in reviewing Dr. Fulton's biography of Cushing in 1947, "No biography can portray fully the force of a man's character and personality but it can provide the material for us to create for ourselves a fairly accurate impression (of him)." The same issue reproduces on page 99 the trencher used at a dinner given by Thomas Sackville, first Earl of Dorset, in 1600; on the trencher are inscribed the six verses on the physician which were written by John Davis (1569-1626) and set to music by John Maynard in 1611. The issue also contains on page 96 a third item of interest to medical historians because it gives assurance that the Harvey Chapel in

Hempstead Parish Church, which had reached a shocking state of dilapidation, has now been suitably restored. It is again a fitting resting place for Harvey, and the Harveian Society of London no longer feels constrained to agitate for removal of the tomb to another and more dignified site. Travelers in England are urged to make a pilgrimage to Hempstead, which lies seven miles to the east of Saffron Walden in Essex.

The Society for the History of Medical Science in Los Angeles held its final meeting of the year on 15 June 1953. Dr. Michel Pijoan of the Española Medical Center, New Mexico, gave the address of the evening entitled "An Inquiry into the Ethnic Medicine of the Navajo."

American Association of the History of Medicine
Twenty-sixth Annual Meeting: Columbus, Ohio
10-12 April 1953

The American Association of the History of Medicine held its Twenty-sixth Annual Meeting on Friday, Saturday, and Sunday, 10, 11, and 12 April 1953 at the Ohio State Museum on the beautiful campus of Ohio State University, Columbus, Ohio. The Ohio State Archaeological and Historical Society and the Ohio Academy of the History of Medicine acted as hosts. Since this is the sesquicentennial year of the State of Ohio, much of the meeting was devoted to the history of medicine and dentistry in that state.

On Friday afternoon there was a joint meeting of the Ohio State Archaeological and Historical Society and the Association. William H. Hildreth, Professor of English, Ohio State University, gave an address on "Men of the Western Waters" and Linden F. Edwards, President of the Ohio Academy of Medical History, described the evolution of that organization. On Saturday afternoon a joint meeting was held with the Ohio Academy of Medical History, with emphasis on one hundred and fifty years of medicine and dentistry in Ohio.

The Fielding H. Garrison Lecture, on Gian Giacomo Bartolotti and his history of medicine, dated 1498, was delivered by Miss Dorothy M. Schullian of Cleveland, Ohio. Charles Donald O'Malley of Stanford, California, commemorated the four-hundredth anniversary of the martyrdom of Michael Servetus in a scholarly paper, while the three-hundredth anniversary of the first English translation of William Harvey's epoch-making work on the physiology of the circulation was emphasized in papers by Chauncey D. Leake of Galveston, Texas, and Guy Kasten Tallmadge of Milwaukee, Wisconsin. To mention a symposium on pre-Columbian Medicine by Dr. Howard Dittrick of Cleveland, Ohio, Dr. Leon Goldman of Cincinnati, Ohio, and Dr. Anderson Nettleship of Little Rock, Arkansas, new light on John Shaw Billings by Dr. Jean A. Curran of Brooklyn, New York, and a lively address on the Etruscans and their medicine by Dr. Ralph H. Major of Kansas City, Missouri, can give only an incomplete

view of the variety of historical matters taken under consideration by members of the Association from widely scattered regions of the United States. At the banquet the William H. Welch Medal of the Association was awarded to Dr. Erwin Ackerknecht of the University of Wisconsin for his outstanding work in medical history.

SAMUEL X. RADBILL

American Association of the History of Medicine

Twenty-seventh Annual Meeting: New Haven, Connecticut

6-8 May 1954

The twenty-seventh annual meeting of the Association will be held in New Haven on 6, 7, and 8 May 1954. Dr. Samuel C. Harvey has been appointed chairman of the Program and Arrangements Committee, the other members being Dr. Herbert Thoms, Dr. Thomas R. Forbes, Dr. Paul D. MacLean, Mr. William B. Walker, Mr. John B. Blake, Mr. Frederick G. Kilgour, Miss Madeline E. Stanton, and Miss Elizabeth H. Thomson, with Dr. Fulton, President of the Association, serving *ex officio*. The Taft will be the headquarters hotel and the annual banquet will be held at the New Haven Lawn Club on Saturday, 8 May.

The first formal session will take place on Thursday evening, the 6th. Three sessions will be devoted to specific topics: (1) The Historical Impact of Curative Medicine on Society (papers by invitation); (2) Interrelations of Chemistry and Medicine; and (3) The Rise of Statistics in Medicine. Members wishing to submit papers for symposia (2) and (3) or on other subjects for the remaining two sessions are invited to send titles to the Chairman on or before January 1st with an abstract of approximately two hundred words.

Egyptian Medicine

Frans Jonckheere of Brussels has made many interesting contributions to the subject of Egyptian medicine. Many of these contributions, however, have been published in journals which do not ordinarily fall into the hands of medical historians. Because of their great value to students of medical history, we have compiled a list of his more important publications during the past eleven years. While this bibliography makes no claim to being a complete one, the list is eloquent testimony to the varied fields of Egyptian medicine which he has clarified by his penetrating studies and analyses.

Autour de l'autopsie d'une momie. Le scribe Boutehamon, Bruxelles, Fondation Égyptologique Reine Élisabeth, 1942.

Une maladie égyptienne. L'hématurie parasitaire. (La Médecine Égyptienne, no. 1.) Bruxelles, Fondation Égyptologique Reine Élisabeth, 1944.

Coup d'oeil sur la médecine égyptienne; l'intérêt des documents non médicaux. *Chronique d'Égypte*, 1945, no. 39-40, 24-32.

Le papyrus médical Chester Beatty. (La médecine Égyptienne, no. 2.) Bruxelles, Fondation Égyptologique Reine Élisabeth, 1947.

Le Bossu des Musées Royaux d'Art et d'Histoire de Bruxelles. *Chronique d'Égypte*, 1948, nos. 45-46, 24-35.

La circoncision des anciens Égyptiens. III^e^ Congrès Nat. des Sciences, Bruxelles, 1950, I. Hist. du Congrès et Hist. des Sciences, 136.

Médecine et malades dans l'ancienne Égypte. *Arch. int. Hist. Sci.*, 1950, no. 11, 320-341.

Le monde des malades dans les textes médicaux. *Chronique d'Égypte*, 1950, *25*, 213-232.

La Place du Prêtre de Sekhmet dans le corps médical de l'ancienne Égypt. Actes du VI^e^ Congrès d'Histoire des Sciences, 1950, 324-333.

A la recherche du chirurgien égyptien. *Chronique d'Égypte*, 1951, *26*, 28-45.

Le cadre professionnel et administratif des médecins égyptiens. *Chronique d'Égypte*, 1951, *26*, 237-268.

Le cautère est une invention pharaonique. *La vie médicale*, 1951, 7^e^ ann., no. 1, X.

La circoncision des anciens Égyptiens. *Centaurus*, 1951, *1*, 212-234.

Défense de la médecine Pharaonique. *Les Cahiers de la Biloque*, 1951, *1*, 3-23.

Diagnostic ex arte de pathologie pharaonique. Communication faite au Comité belge d'Histoire des Sciences, le 28 avril 1951.

Subincision et excision, mutilations sexuelles pharaoniques? *Hist. de la Méd.*, 1951, *10*, 3-7.

L'examen du malade dans la pratique médicale Pharaonique. *Les Cahiers de la Biloque*, 1952, *2*, 129-143.

Médecins de cour et médecine Palatine sous les Pharaons. *Chronique d'Égypte*, 1952, *27*, 51-87.

La "Mesdemet," cosmétique et médicament égyptiens. *Hist. de la méd.*, 1952, *7*, 2-12.

R. H. M.

Book Reviews

WILLIAM BROCKBANK. *Portrait of a Hospital 1752-1948.* To Commemorate the Bi-Centenary of the Royal Infirmary, Manchester. London, William Heinemann Ltd., 1952. x + 217 pp., illus. 25s.

Reviewed by SAMUEL C. HARVEY, *Professor of Surgery Emeritus, Yale University School of Medicine, New Haven, Connecticut.*

THESE are the annals of a great provincial hospital, based largely upon its yearly reports. The author is a distinguished physician and a member of the professional staff. His historical interest seems to be hereditary, for his father, Edward Mansfield Brockbank, is likewise a member of the staff and has written extensively about the Infirmary and medical affairs in Manchester. Fortunate is an institution or a community to have those historically minded so devoted to it.

The first chapter of the *Portrait of a Hospital* entitled "The Beginning" covers the initial ten years; a few interesting pages give a description of the town, the activities of its inhabitants, and the state of medical practice, thus representing a thumbnail sketch of an English trade town of the mid-eighteenth century. The story is then told of the steps taken toward the establishment of the Infirmary and the great care used in drawing up the "Rules and Orders of the Infirmary" which were at once printed (and now appear in an appendix at the end of this volume). Having done this, the founders soon raised a sufficient fund to enable them to furnish with beds and other necessities their small, newly built home on Garden Street. In three years, so successful had the venture been, that "The New Infirmary" was built on the site where it was to remain, with many additions and renovations, until 1908 when the present Infirmary was constructed and occupied.

It would have been of interest if Dr. Brockbank had given more fully than he has done the genesis of this Infirmary, for it did not spring into being without antecedents elsewhere. It is not commonly understood that a reform in medical care, particularly as regards the provision of hospitals, swept through England, Scotland, and Ireland during the first half of the eighteenth century. Too much emphasis perhaps is laid on the deplorable and sordid conditions obtaining in the early industrial communities of that time although it is difficult to exaggerate them; too little on the efforts toward their alleviation, from which originated many of the present-day societal attitudes and measures.

A number of the provincial towns in Britain had shortly before 1752 instituted "infirmaries." This term was substituted for that of "hospital" for two reasons. Previously, institutions related to religious establishments and traditionally for the care of "incurables" were called hospitals; such were Saint Bartholomew's and Saint Thomas's in London. Sir Thomas Browne in his *Religio Medici* (1643) writes, "For the world I count it not

an Inne, but an Hospitall, and a place not to live, but to die in." The term "infirmary" came into use after the separation of the Church of England from Rome with confiscation of religious endowments and with the subsequent reformation in England and Scotland. The infirmary was a secular institution free from church and state and supported by voluntary offerings or contributions from members or subscribers who for the most part were "dissenters."

The Infirmary of Edinburgh was an early example, and that of Liverpool another, preceding that of Manchester only by some three years. It is understandable that Charles White and other physicians who were familiar with similar institutions in London and Edinburgh were capable of initiating the Manchester Infirmary, first setting down in its "Rules and Orders" precise details of its organization and management.

"Having," as Dr. Brockbank writes, "triumphantly launched the Infirmary the board flanked it with a Lunatic Asylum in 1766 and a complete suite of public hot, cold and vapor baths in 1780." The inception of this institution for the kindly care of the insane, second in time only to St. Luke's in London, is a landmark not only in Britain but elsewhere. This important contribution is referred to chronologically throughout the volume and indexed under "lunatic Hospital," and "Cheadle Royal," a name it acquired after being moved to the town of Cheadle in 1850. The author has previously (1934) published a short history of this institution which is more readily informative.

From the start the Infirmary had served not only "in-patients" but "out-patients" as well and this was extended in 1781 to "home-patients"; by 1786 the number of these treated annually had reached one thousand. In 1792 a newly built Dispensary was opened, and increased accommodations in the Infirmary were provided in 1793 by a new wing. With this expansion of its facilities, the institution proposed to admit medical students who were, as was the custom, apprentices to the physicians attending it. At about the same time "a number of gentlemen led by Ferriar" organized a public health service, formed a "Board of Health," and set up a "fever hospital" sepaarte from the Infirmary, thus relieving it of patients with contagious diseases as well as relieving the physicians of caring for them in their homes. Meanwhile, in 1790, Charles White and other men midwives on the staff of the Infirmary had resigned and established a house obstetrical service known as the Lying-in-Charity, which eventually developed into St. Mary's Hospital for Women and Children.

The remainder of the annals is less stimulating, for it describes merely the growth of the Infirmary and the vicissitudes that seem to be common to all hospitals. The final chapter is entitled "1939 to 1948—Destruction and Rehabilitation" and is followed by a brief "epilogue" recording the fact that the Infirmary had passed under the governing board of the United Manchester Hospitals as "approved" by the Minister of Health.

It is well that these annals of a voluntary hospital have been recorded; it is a factual record of what spirited citizens and able physicians working in a common purpose have been able to accomplish in the past. It is not, however, a history but rather an accumulation of information to be used, it is hoped, for such a volume in the near future. For this the Doctors Brockbank have laid the foundation, not only in the "Portrait" but in several other contributions. These are noted in the references distributed at the end of each chapter, an arrangement which is somewhat awkward. There is a short index which is adequate for the purpose.

CLAUDE BERNARD. *Esquisses et Notes de Travail Inédites de Claude Bernard, Recueillies et Commentées par Léon Binet.* Paris, Masson et Cie, 1952. 112 pp. 1600 fr.

Reviewed by J. M. D. OLMSTED, *Professor of Physiology, University of California, Berkeley, California.*

AT least four volumes devoted to the contents of Claude Bernard's notebooks and the jottings he made on odd bits of paper have already appeared in the twenty years since your reviewer first leafed over a collection of such material preserved at the birthplace in St. Julien. In this latest volume Professor Léon Binet presents what the publishers believe will be the last of such offerings. In order to show the nature of the source material, sixteen pages of the book are devoted to facsimile reproductions of notes in Bernard's handwriting, together with samples of what can only be called doodling and an expense account. The notes are grouped under ten headings: (1) the glycogenic function of the liver; (2) artificial diabetes by nerve puncture; (3) vasomotor nerves; (4) experimental medicine; (5) fats, fermentation, the nervous system, digestion, liver-spleen relations, and respiration; (6) poisons; (7) comparative physiology; (8) medical aspects of Bernard's work; (9) Bernard as a professor; (10) Bernard as a philosopher. This is a very complete outline of Bernard's work and touches practically every phase of his activities. Professor Binet has incorporated the quotations he has chosen into a narrative, so that each section gives not only a picture of Bernard's accomplishments along a given line, but also shows how these ideas have been the starting point for many modern developments in physiology. For example, he says one cannot speak of the sugar-regulating center in the medulla, which Bernard discovered in his famous piqure experiment, without asking whether there are other such centers, and as an answer to this question he cites the recent finding that extracts of the anterior lobe of the pituitary can produce diabetic effects. Again he outlines how in his own laboratory he has, with a new technique, studied the sympathetic vasomotor innervation of the hind leg of a dog, a direct sequel to Bernard's experiments on the sympathetic nerve to the rabbit's ear which led him to the discovery of vasomotor nerves. In fact, the

comments appear to occupy as much space in the text as the quotations, and the whole gives an excellent picture of Bernard as a scientist and a thinker. It is a valuable addition to the list of writings which attempt to assign to Bernard his proper place in the history of science.

GIORGIO ABETTI. *The History of Astronomy*. New York, Henry Schuman, 1952. 338 pp., illus. $6.00.

Reviewed by JOHN W. STREETER, *Assistant Director of the Fels Planetarium of the Franklin Institute, Philadelphia, Pennsylvania.*

THE development of astronomy through the ages is treated sympathetically, almost reverently, by all writers who deal with the history of science. However, as a subject in its own right only the earlier periods seem to be attractive to contemporary scholars. Notable work has been done in recent years on medieval and seventeenth century problems while the researches of Neugebauer have greatly advanced our knowledge of the mathematical and astronomical accomplishments of the Babylonians and still earlier Middle East peoples.

None of this activity has encouraged anyone to give us a new basic history of astronomy in English on a "standard work" or reference scale. Those who are happy in their German and capable of subtracting the strong Germanic bias have made good use of Ernst Zinner's writings the latest of which is *Astronomie, Geschichte ihrer Probleme* (Munich, 1951). In addition there have been Peter Doig, *A Concise History of Astronomy*, largely in unadorned topical treatment, and Angus Armitage, *A Hundred Years of Astronomy* (the last hundred years), an excellent treatise as far as it goes.

This history of astronomy by the renowned Italian authority on the sun has great merit and will prove widely useful in spite of the fact that it is a compact affair with virtually no references. The special advantages of the author are his familiarity with the main currents of his science during the present century and his sure and unprejudiced historical perspective.

If this book is slanted towards the Mediterranean, as many will think, it does no more than redress the balance upset by the Anglo-Saxon versions which we have inherited. Admittedly some lesser Italian figures get more than the expected space but it is good to see men of stature like Father Angelo Secchi come into their own. He was the founder of spectral classification and an influential pioneer in astrophysics.

Students of the history of science today are seldom exposed to the important work of G. V. Schiaparelli, of whose historical writings few have found their way into English. In fact, he is best remembered today for having unintentionally precipitated the bitterest controversy in astronomy when he observed the "canali" (properly translated as "channels") on Mars and remarked their germination. To a wider public he is recognized as the uncle of the Schiaparelli who started a lucrative dress business. Abetti's

history gives English readers for the first time a work that incorporates Schiaparelli's findings and also does justice to him as an astronomer. Professor Abetti is a worthy successor, writing on the whole range of the science after a distinguished career in the forefront of research.

Americans became familiar with the director of the solar observatory at Arcetri (near Florence) when Abetti's book on the sun was translated in 1938 and promptly became required reading for all students of astronomy above first year. It is a blessing that one among the top practitioners can see contemporary work so clearly against the background of all that has gone before. The book has authority and balance.

Two reasons for the success of this history unrelated to the basic content are the precise yet attractive style of the gifted translator and the fine production we have come to expect in a Henry Schuman Life of Science Library book.

More than possibly any other volume in this series *The History of Astronomy* is destined to become the handy reference for a whole science. It seems odd that anything as engaging as this account of the growth of astronomical understanding could be the court of first appeal but such is the case. Not only are the principals named and their contributions described but the rise and influence of the various schools are defined in a way that serves the purpose of the students of intellectual history.

All this in 338 pages, which makes the true lover of the byways of astronomy wish it were vastly longer. Costs being what they are, greater length would run the price above six dollars which is the highest of the Life of Science group. Even at this length Abetti has ingeniously managed to quote from actual sources often enough to make great men live in a way many histories never achieve. Singularly prophetic is Eddington's anticipation of the atomic bomb "an ominous cloud in the distance though at present (1929) it be no bigger than a man's hand." It is good and it is eminently readable. Would that all our reference works could so picture the forest for us among the trees.

JAMES GRAY. *History of the Royal Medical Society 1737-1937.* Edited by Douglas Guthrie, with a foreword by Sir Robert Hutchinson. Edinburgh, The University Press, 1952. xi + 355 pp. 42/.

Reviewed by JACK PETER GREEN, *Student Editor, Journal of the History of Medicine and Allied Sciences, Yale University School of Medicine, New Haven, Connecticut.*

AFTER supper and a 'social evening at a tavern' early in the autumn of 1734, six medical students at the University of Edinburgh agreed to meet once a fortnight at their respective lodgings to discuss a dissertation on a medical subject presented by one of the members of the group. These "founders" realized that '. . . it was not merely the frigid plodding on

books, nor the doctrines and precepts of age and authority; nor the little detail of an empirical practice, that could inspire that taste and spirit, and give that manly turn to our enquiries, which alone can render study agreeable, vigorous, and successful. They perceived, that it was in society alone, by the mutual communication and reflection of the lights of reason and knowledge that the intellectual as well as the moral powers of man are exalted and perfected.' Three years after its inception, the association, composed of ten members, was formally constituted, and the following year, incorporated. From this casual beginning, the Royal Society of Edinburgh grew to include among its members some of the most venerated names in medicine.

The growth of the Society paralleled the ascent of Edinburgh as a university and medical center. There, the medical course, founded on the teachings of Boerhaave, attracted students from the colonies, from America, and even from England where the scholastic methods still held sway. 'Circumstances concurred that gave a stability to the University of Edinburgh which the labours of Gaubius could not give to Leyden nor the genius of Haller procure for Göttingen. Its discipline was more liberal, and its institutions less monastic than those of universities founded at earlier periods. The ready access it afforded to well-furnished libraries obtained for the student of medicine an easy acquaintance with the most valuable writers of his profession. And, to these advantages were added a spirit of investigation, and freedom of enquiry, hardly known in other seminaries.'

With the history of the Edinburgh Medical School as a frame of reference, the late Mr. Gray describes the growth of the Society, its struggle to become a corporate and smoothly functioning body, its success in formulating policies and establishing orderly processes. Throughout the narration there are deft sketches of those 'men whose memories we delight to honour.' Many of the members have become illustrious figures in medicine; others, as 'medical truants,' distinguished themselves in other fields. Among the eminent are Oliver Goldsmith, Gilbert Blane who introduced to the Navy the use of lemon juice as prophylaxis for scurvy, John Morgan, William Shippen, and Benjamin Rush, all of whom helped to found the University of Pennsylvania School of Medicine, Caspar Wistar, Caleb Parry whose description of exophthalmic goitre preceded Graves' by almost fifty years, James Mackintosh, John Haslam, Astley Cooper, George Birkbeck, Henry Brougham, John Cheyne, Richard Bright, Thomas Addison, William Sharpey, Thomas Hodgkin, Charles Hastings, founder of the British Medical Association, Joseph Lister, Joseph Bell, the prototype of Sherlock Holmes, Crum Brown, Thomas R. Fraser, Dyce Duckworth, William Rutherford, Byrom Bramwell, James Mackenzie, Sims Woodhead, founder of the *Journal of Pathology and Bacteriology*, J. S. Haldane, and James Paget.

The Society flourishes today, remaining primarily a student group. The members are no doubt proud of this chronicle. It is a pity indeed that Mr. Gray did not live to see it published.

SIR ISAAC NEWTON. *Opticks. Or A Treatise on the Reflections, Refractions, Inflections & Colours of Light.* Based on the Fourth Edition, 1730, with a Foreword by Albert Einstein, an Introduction by Sir Edmund Whittaker, a Preface by I. Bernard Cohen and an Analytical Table of Contents prepared by Duane H. D. Roller. New York, Dover Publications, Inc., 1952. xciv + 406 pp. $1.90 paper; $3.95 cloth.

Reviewed by JOHN F. FULTON, *Professor of the History of Medicine, Yale University, New Haven, Connecticut.*

THIS important reprint represents a response to the great need for current texts of important landmarks in the history of science. The history of science movement has become widespread in schools and universities both in this country and abroad, and an edition of Newton's *Opticks* will be especially welcome because it did so much, not only to advance our concept of light, but to fire the imagination of educated men and women in the eighteenth century. Most appropriately, this edition is dedicated to Marjorie Hope Nicolson "who has uncovered the influence of the *Opticks* on 18th-century imagination." That I. Bernard Cohen, who is evidently the instigator of this reprint and who has contributed a scholarly Preface, should have secured the co-operation of men such as Albert Einstein and Sir Edmund Whittaker is evidence enough of contemporary regard for the importance of the book.

The remarkable thing about this reprint is that it is being made available in paper covers, unbound for one dollar and ninety cents. Cloth-bound copies can be secured for four dollars. The significance of the book is well summarized in the first paragraph of Dr. Cohen's Preface:

> Great creations—whether of science or of art—can never be viewed dispassionately. The *Opticks*, like any other scientific masterpiece, is a difficult book to view objectively; first, because of the unique place of its author, Isaac Newton, in the history of science, and, second, because of the doctrine it contains. One of the most readable of all the great books in the history of physical science, the *Opticks* remained out of print for a century and a half, until about two decades ago, while the *Principia* was constantly being reprinted. One of the reasons for this neglect was that the *Opticks* was out of harmony with the ideas of 19th-century physics. The burden of this book was an exposition of the 'wrong' (i.e., corpuscular) theory of light,—even though it also contained many of the basic principles of the 'correct' (i.e., wave) theory. Not only had Newton erred in his choice of the corpuscular theory, but also he apparently had found no insuperable difficulty in simultaneously embracing features of two opposing theories. It was not just that Newton couldn't make up his mind between them; that could be easily forgiven. Rather, by adopting a combination of the two theories at once, he had violated one of the major canons of 19th-century physics, which held that whenever there are two conflicting theories, a crucial experiment must always decide uniquely in favor of one or the other.

Swedish Men of Science 1650-1950. Edited and with an introduction by Sten Lindroth. Translated from the Swedish by Burnett Anderson. Stockholm, The Swedish Institute (Uppsala, Almqvist & Wiksell), 1952. 296 pp.

Reviewed by ADOLPH B. BENSON, *Professor Emeritus of German and Scandinavian, Yale University, New Haven, Connecticut.*

DURING the late Middle Ages, Sweden was still intellectually an isolated country. Situated in the distant North, Christianity and European civilization in general had been slow in reaching Swedish soil. Ambitious Scandinavian students had attended foreign institutions of learning, especially the University of Paris, and it was not until 1477 that Sweden established a university of its own. Shortly thereafter, in the sixteenth century, violent political disturbances, wars, and the Reformation impeded seriously the educational progress of the nation, and it was only in the reign of Gustavus Adolphus, during Sweden's greatest political era of the seventeenth century, that it was definitely revived. In addition, colleges were founded in the Swedish possessions abroad; Catholicism was replaced by Lutheranism as a state religion; and scholastic, humanistic, and theological studies were threatened by scientific thought. Queen Christina, the daughter of Gustavus Adolphus, imported noted foreign scholars and thinkers to the Swedish court, including Descartes, the French philosopher, who died at Stockholm in 1650. By this time science and philosophy were arousing greater interest in Sweden, and in 1652 the young enthusiast Olaus Rudbeck demonstrated in a public lecture at Uppsala his discovery of the lymphatic vessels in the human body. Among the notables attending was the young Queen Christina. This brings us to the volume under review.

The reviewer once entertained the presumptuous ambition of writing just such a book as the one before us. Now he can definitely abandon his dream, for this work is much better than any he could have produced. Twenty-nine essays on thirty scientists by twenty-five specialists, plus a comprehensive introduction and bibliography by the editor—who also wrote some of the articles—comprise the contents of the volume. They make instructive, fascinating reading for both scholars and laymen. Needless to say, it is a timely work: the world would like to know more about the scientists of the country which awards the Nobel Prizes in science. The editor and co-author, incidentally, is a *docent* at the University of Uppsala, whose special interest is the history of education in its broadest and most profound sense. The translation, by Anderson, is clear and smooth; only a couple of times do we notice a slight slip in idiomatic English, and in a few instances we suspect that the word "spiritual" should be "intellectual." But we have not seen the original.

In general the essays give first of all, naturally, a condensed record of the subject's scientific achievements, with sufficient biographical data to provide the requisite orientation. An outstanding character of *Swedish Men of Science* is the total absence of any nationalistic bias. It is amazingly

sober and objective. Swedes are said to be more eager to praise a foreigner than a native. However that may be, Lindroth gives the impression of being just, discriminatory, and cautious in his evaluations. It is therefore a highly useful contribution. Besides, the scrupulous attention paid to connections with foreign scientists and their influences gives it a universal importance.

The work is a selective one; only the more prominent scientists could be included, although the text contains references to many others. In the list, however, we find not only such well-known names as Linné, Swedenborg, Scheele, Bergman, Berzelius, Celsius, Angström, Arrhenius, and The Svedberg, but lesser-known scholars like Rudbeck, Hjärne, Cronstedt, Klingenstierna, Wargentin, Wilcke, Thunberg, Lovén, and Fredholm. It is a convincing list, showing that even small nations may have great men. Lindroth in his final analysis, however, emphasizes that Swedes deal more with facts, classification, and order than with the invention of new theories. This is correct. Swedes keep their feet on the ground, except occasionally when they go into religious speculations. Of the thirty scientists selected, eleven specialize in the biological fields—botany, zoology, physiology, anatomy, entomology, ophthalmology, and medicine. Several, like Carl von Linné, Urban, Hjärne (d.1724), and Nils von Rosenstein (d.1773), were successful practising physicians. Sweden can be proud of its work in medicine, particularly that of the eighteenth century. In the twentieth Allvar Gullstrand (d.1930), ophthalmologist, received the Nobel Prize in medicine. Other Nobel laureates included in *Swedish Men of Science* are Svante Arrhenius (d.1927), in chemistry, and The Svedberg and Manne Siegbahn, in physics. The latter two are still very active, and Siegbahn contributed to our volume the essay on Janne Rydberg.

Strikingly individualistic and attractive in both character and achievement are these Swedish men of science. For example, there is the aforementioned Rudbeck, who was an expert in everything from botany to music; Linné, the internationally known superenthusiast and founder of the binary system of nomenclature in biology; Axel Fr. Cronstedt (d.1765), who discovered the metal nickel; Pehr Wilhelm Wargentin (d.1783), who introduced the system of vital statistics into Sweden; Charles De Geer, "Sweden's richest man," an entomologist and horticulturist who tried to raise pineapples in Sweden; Johan Carl Wilcke (d.1796), physicist, who translated a letter by Benjamin Franklin on electricity into German, 1751; Torbern Bergman (d.1784), founder of chemical analysis; Carl Wilhelm Scheele (d.1786), independent discoverer of oxygen; Carl Peter Thunberg (d.1828), founder of Japanese botany; Anders Jonas Ångström (d.1874), originator of the so-called Ångström unit in physics; Adolf Eric Nordenskjöld (d.1901), explorer, discoverer of the Northeast Passage (not Northwest, as given on the jacket); and Janne Rydberg (d.1919), who had such a phenomenal memory that he could ordinarily calculate with logarithms without the use of logarithmic tables.

Swedish Men of Science would profit by an index because of its numerous references to scholars not officially included in the selection. Also, for American readers and distributors, the work might well profit if it contained an essay on Pehr Kalm, botanist and pupil of Linné, who two centuries ago published three volumes on his *Travels in North America* wherein he had recorded religiously *everything* he had seen between Philadelphia and Montreal. He had been sent by the Swedish Academy of Sciences to find plants in America sturdy enough to grow on Swedish soil. He was probably the first European fellow to do serious research in the American colonies. For him was named the state flower of Connecticut and Pennsylvania—*Kalmia latifolia.*

FREDERICK C. WAITE. *History of the New England Female Medical College.* Boston, Boston University School of Medicine, 1950. 132 pp.

Reviewed by WILLIAM B. WALKER, *Department of the History of Medicine; Candidate for the Ph.D. degree in the History of Medicine, the Johns Hopkins University, Baltimore, Maryland.*

THE story of the New England Female Medical College, the earliest ancestor of the present-day Boston University School of Medicine, aptly demonstrates the confusion and insecurity which resulted from the disorganization of medical education in the United States during most of the nineteenth century. Disagreement between the faculty and the Trustees as to the aims and goals of the curriculum resulted in a continuous clash of personalities and the resignation of some of the most worthwhile teachers, while the lack of funds and facilities for classroom and clinical instruction proved an obstacle sufficient ultimately to bring about the downfall of the institution itself. Yet in spite of these and other difficulties, which included a background of rivalry between the medical profession and several sectarian groups, and even an investigation by the Massachusetts legislature, the College served a useful purpose.

At the time of founding (1848) the New England College was the first medical school to be restricted solely to women, antedating the Female Medical College of Pennsylvania by two years. Since it was apparent soon after opening that only a small attendance could be expected and that, as a result, revenue from the traditional source of student fees would not maintain college expenses, to say nothing of payment of the faculty, several ingenious expedients were adopted. Thus the College was operated for eight years under a charitable society whose board members were expected to contribute funds and solicit gifts, and this custom persisted even after the society itself was dissolved. The College petitioned for and received $15,000 from the state, of which $5,000 was designated to support two hundred student scholarships over a period of thirteen years. In addition to this, funds were received from two private bequests, one of which, from the estate of Benjamin Waterhouse, yielded $10,000 to endow a professor-

ship of anatomy. Fortified by these events, the College undertook to pay salaries to the faculty members on an annual basis and managed to continue this startling innovation for the remainder of its existence.

Though the curriculum was modeled after that currently in vogue—a series of lectures given to all the students at the same time on preclinical and clinical sciences and lasting but seventeen weeks—the College did attempt some improvements. A course of "Lectures for Ladies" dealing with personal hygiene was offered, particularly for those who could attend only one session instead of the two required for the M.D. degree. It was expected that such students could qualify for positions in the Massachusetts public schools, where the teaching of hygiene had recently been made mandatory by law. Less successful, however, was the attempt to train nurses as well as doctors, for this opportunity vanished when a faculty squabble drove some of the staff to found an independent hospital—the New England Hospital for Women and Children—which eventually became the site of one of the first training schools for nurses in the United States. Finally the College, faced either with bankruptcy or alliance with a financially stronger institution, decided to amalgamate with the Boston University School of Medicine, which at that time was under Homeopathic auspices. The irony of this situation, in which a regularly established school yielded to one professing sectarian doctrines, proved only temporary.

Throughout the narrative Dr. Waite has shown the results of careful research, and he is to be congratulated in his continuing efforts to bring more light to a little known but formative phase of American medical history.

J. J. IZQUIERDO. *Un Veterano del Ejercito Permanente.* Mexico, D. F., Ediciones Ciencia, 1951. 525 pp., illus.

Reviewed by JOSÉ M. R. DELGADO, *Instructor in Physiology, Yale University, New Haven, Connecticut.*

SEVERAL accounts of the history of the Mexican Army have been written, but facts have often been distorted by the bias of the author. In this book, Dr. Izquierdo tries to present an objective picture of the origin and the development of the Mexican Army, discussing historical fact, some of it glorious and some of sad memory, aiming to teach Mexican youth the lessons of the future by the experiences of the past, and stressing the necessity of placing service to country above the interests of various groups and parties. The book begins with a discussion of the reasons for the decline of Puebla, one of the most prosperous cities of Mexico in the early nineteenth century. The tempestuous course of the Mexican Republic, newly born at this time, is presented parallel with the life of Raudón, who, beginning in 1840 as Alferez, became one of the leading commanders of the Mexican army. Politics, revolutions, wars, quarrels among leaders, success and defeat—all the turbulence of a strenuous era is presented in this well-documented book. The interesting personality of the author is evident through-

out; he is at once Professor of Physiology in the National University, Mexico City, Surgeon General of the Army, and a well-known historian. Some of his masterful drawings are included among the pictures and maps which illustrate the book. Its philosophical implications and the moral concept of an independent country above the interests of men and political parties make this book an important contribution to Mexican history.

ÅKE MEYERSON. *Studier i Serafimerlasarettets instrumentsamling. Utgivna med anledning av lasarettets 200-årsjubileum.* Stockholm, Karolinska Institutets Kirurgiska Klinik vid Serafimerlasarettet, 1952. 135 pp., illus. Pris häft. 29:50, inb. 35:.

Reviewed by BERT G. ANDERSON, *Associate Professor of Surgery, Yale University School of Medicine, New Haven, Connecticut.*

MAN'S words are often less trustworthy than his works. Words may be employed to conceal, or by deception to lead one away from, rather than to elucidate a truth. Even when one intentionally attempts to bring out a truth, words may fail, either owing to their own inadequacy or because they are not well chosen. But man's works more often speak openly and directly. His handiwork is revealed before you plainly, to be read and interpreted. Thus it is possible for the archeologist to inspect a piece of baked clay and reconstruct a good portion of the culture of the race that fashioned this pottery. The historian, on the other hand, who draws his knowledge from an ancient script, is more easily led astray.

A surgeon-antiquarian has much to learn of the development of his art from a collection of representative instruments. Such an accumulation of surgical equipment has been made available, to those who are not privileged to visit the museum, through the text and illustrations by Åke Meyerson in his splendid presentation entitled "Studies of the Instrument Collection at the Seraphim Hospital" in Stockholm. Anyone who is fortunate enough to obtain a copy of this well illustrated book, with its delightful text, may be prepared to spend a rewarding evening in his study. All those who are interested in the development of surgery should be grateful to the author for his fine contribution to medical history.

"The present work is a sequel to the investigations and classifications of early surgical instruments carried out by the author in 1945 for the Council on the History of Medicine of the Swedish Medical Association. It is published on the occasion of the Bicentennial Jubilee of Serafimerlasarettet.

"An important section of the book is the presentation of Olof Acrel's lectures on surgery, with the commentary in the chapter on trepanation by Docent Olof Sjöqvist, M.D., and in that on operations on the eye by Professor K. G. Ploman, M.S. Professor J. P. Strömbeck, M.D., ha sannotated the eighteenth century operations for stone, and has written a chapter on stone crushing procedures at Serafimerlasarettet.

"Besides the instruments used in the hospital, of which the implements of Olof Acrel, 'the father of Swedish surgery,' formed the nucleus of the eighteenth century instrumentarium, a collection of instruments from Karolinska Institutet, originating with the instruments appurtenant to the professorship of surgery at the middle of the eighteenth century, was added at a comparatively late date. Many early inventories of the collection have not been preserved. The only complete lists date from the beginning of the nineteenth century and cover the items then in the posssion of Karolinska Institutet."

The format of this book, more often seen among European than American publications, with marginal columns presenting footnotes and legends in finer print, is attractive and readable. A five-page summary in English, together with the fine illustrations, will serve to convey the gist of the book to English readers.

The Caraka Samhita. Expounded by the Worshipful Atreya Punarvasu, compiled by the Great Sage Agnivesa and redacted by Caraka and Drdhabala, edited and published in six volumes with translations in Hindi, Gujarati and English by Shree Gulabkunverba Jamnagar, India. Ayurvedic Society, 1949. Rupees 125/.

Reviewed by GEORGE ROSEN, *Professor and Head of the Department of Public Health Education, Columbia University, New York, New York.*

THE medicine of India presents many difficult problems for the medical historian. In the first place, there is the problem of chronology in its general political and cultural history and, secondly, the problem of establishing basic data concerning persons and texts of central concern to medical history. Despite difficulties, however, enormous advances have been made within recent decades. The archaeological record of human settlement in India goes back to a period far remote in geological time. By the third and second millennia B.C., however, an advanced culture had developed of which extensive evidence has been uncovered at Mohenjo-daro and Harappā. Writing was known and employed, but unfortunately the peculiar script of this culture is still undeciphered so that the entire civilization remains "prehistoric." Sometime in the middle of the second millennium B.C. this civilization succumbed to the inroads of certain barbaric Indo-European tribes. Thereafter, there is a complete lack of any written documents on stone, clay, or metal until the time of Asoka about the middle of the third century B.C. For the intervening periods we have to depend on occasional contacts with the West, or on information that may be extracted from legends or the religious literature of India.

The earliest known written treatise by an Indian physician is that of Caraka. Nothing definite is known concerning the author of this work. A number of theories have been suggested, among them the idea that Caraka was court physician to King Kanishka (around the end of the first century

A.D.). This opinion is rejected in the work reviewed here; instead, it is suggested that Caraka be placed in time between the third and the second centuries B.C. But whatever Caraka's identity, it is evident that the work connected with his name is a fundamental document of Indian medical history, deserving careful and detailed study.

For the use of students a satisfacory text with proper explanatory materials is required. This need has now been filled in masterly fashion in the six-volume edition of the Caraka Samhita reviewed here. This edition was prepared by a learned editorial board headed by Dr. P. M. Mehta. In addition to the original text, this monumental edition also contains translations in English, Hindi, and Gujarati. The six volumes contain the following: Volume one is introductory and is intended to provide the reader with the background information needed for an understanding of Caraka. The actual text itself, with the translations into English, Hindi, and Gujarati, as well as footnotes, occupies the second, third, and fourth volumes. The fifth volume contains the complete text and table of contents in English, and the sixth volume indexes for the entire work, lists of diseases, drugs, recipes and other matters mentioned, together with sketches and pictures of the flora and fauna mentioned by Caraka. This edition should be useful to the scholar as well as to the student of medical history who does not command a knowledge of Sanskrit.

As an introduction to Caraka's treatise, volume one provides a history of medicine in ancient India, as far as this can be reconstructed, and then an analysis of the philosophical concepts in Caraka leading to a discussion of general pathology. The American and English readers who do not read the original text, or the other languages into which it is translated, will derive the greatest knowledge by reading the first and fifth volumes, and turning to volume six for reference purposes whenever necessary. More advanced students will, of course, want to use volume two, three, and four with the parallel translations.

Even the most cursory contact with Caraka makes it quite clear that the treatise connected with his name is the product of a highly developed culture. From internal analysis of the text and from other bits of evidence, it may be accepted that the treatise of Caraka is itself based on a number of earlier works. It is interesting to note, for example, the evidences of social stratification as these are reflected in medical care. Treatment prescribed for the nobility is modified for members of the lower classes according to the status of the patient.

It is manifestly impossible in a review to call attention to all the significant aspects of an important achievement such as that represented by this new edition and translation of the *Caraka Samhita*. There is no doubt, however, that this is a very valuable contribution to the history of medicine. As India takes her rightful place in the modern world, and as this great nation of the East brings modern knowledge into consonance with her his-

toric culture, an understanding of Ayuvedic medicine and its modern literature will be needed. To this end Dr. Mehta and his co-workers have made a basic contribution.

LUDWIG TELEKY. *Die Entwicklung der Gesundheitsfürsorge; Deutschland, England, Berlin, U.S.A.* Berlin, Springer Verlag, 1950. 142 pp.

Reviewed by GEORGE ROSEN, *Professor and Head of the Department of Public Health Education, Columbia University, New York. New York.*

THIS slim volume is intended to present to a German-reading audience a comparative account of the development of public health during the past hundred years in Germany, England, and the United States. Dr. Teleky, the author, was for many years a public health leader in Austria and Germany, particularly active in the areas of occupational health and social medicine. In the course of his long and eminent career Dr. Teleky became well acquainted at first hand with the European and British public health scene. After leaving Europe because of the Hitler regime, he settled in the United States, where he had ample opportunity to observe us. Thus equipped, Dr. Teleky is in an excellent position to present a comparative picture. In ten chapters, he traces the development of social hygiene—what we would call preventive and social medicine—the distribution of health personnel and facilities, social insurance, tuberculosis control and welfare, venereal disease control, care of mother and child, control of diphtheria and rickets, the health of the school child, and nutrition. The author points out the differences as well as the similarities in the development of the three countries. He concludes, however, that despite variations in specific details, the logic of fact and situation has in all three countries tended to overcome political slogans, political theories, and economic hypotheses. The general trend is the same everywhere. While the American reader will perhaps not learn anything new from this study, it is nevertheless salutary and refreshing to see ourselves as others see us.

SAMUEL WOOD GEISER. *Medical Education in Dallas: 1900-1910.* Southern Methodist University Studies No. 7. Dallas, Southern Methodist University Press, 1952. 23 pp.

Reviewed by CHAUNCEY D. LEAKE, *Vice-President, University of Texas School of Medicine, Galveston, Texas.*

THIS little item is prepared chiefly for the purpose of keeping the record clear. It gives data relating to the nine Dallas medical schools projected during the decade ending 1910, with some note of the medical training of the men concerned with them. All of these schools were originally proprietary, and reflect the common and wearisome tale of personal ambitions and antagonisms in medicine existing in most large American medical

centers until recently. The University of Dallas Medical School was organized in 1900 and became Baylor University College of Medicine in 1903. This was the only one of the Dallas medical schools to survive the devastating effect of the famous report of Abraham Flexner on medical education in the United States and Canada in 1910. Doctor Geiser records carefully and accurately the details involved in the organization and attempted development of the medical schools of Dallas.

CAELIUS AURELIANUS. *Gynaecia. Fragments of a Latin version of Soranus' Gynaecia from a thirteenth century manuscript,* edited by Miriam F. Drabkin and Israel E. Drabkin. (Supplements to the Bulletin of the History of Medicine, No. 13). Baltimore, Johns Hopkins Press, 1951. xv + 136 pp. $3.00.

Reviewed by GEORGE ROSEN, *Professor and Head of the Department of Public Health Education, Columbia University, New York, New York.*

THIS publication supplements the recent edition and translation by Dr. I. E. Drabkin of the works of Caelius Aurelianus *On Acute Diseases* and *On Chronic Diseases* (University of Chicago Press, 1950). It comprises the textual matter contained in a thirteenth century Latin manuscript. This section contains a combined compilation derived chiefly from two different translations and abridgments of the *Gynaecia* of Soranus, one by Caelius Aurelianus, the other by an otherwise unknown Mustio (or Muscio). Owing to the difficulty and, in some places, the virtual impossibility of separating the two versions, the editors offer a text which gives the Caelian version with interpolations of Mustio in varying degree.

Soranus of Ephesus, who practised medicine in Rome under Trajan and Hadrian, wrote extensively on medicine and many other subjects. Among these works is his *Gynaecia,* which deals with gynecology, obstetrics, and pediatrics. A considerable part of this treatise is still extant in the original Greek. Caelius was the foremost of Soranus' translators, and prepared Latin versions of many of the latter's works. The text presented by the Drabkins gives us substantial fragments of his version of Soranus' gynecological work.

The significance of this publication lies in the fact that comparison of the new material from Caelius with the Greek original will facilitate our understanding of the text of Caelius' treatise on acute and chronic diseases, for which the original text is no longer extant. Furthermore, it throws light on the text of Soranus, indicating possible lacunae.

The editors have carried out a difficult editorial task with acumen and elegance, so that the text is easily usable and at the same time it is possible to recognize visually its various components. It is a useful contribution both to ancient and medieval medicine. There is an index of names and subjects.

Homenaje a Cajal en el Primer Centenario de su Nacimiento. A symposium from *Cuadernos Americanos,* no. 4, July-August. Mexico, D.F., 1952. 73 pp., illus.

Reviewed by JOSÉ M. R. DELGADO, *Instructor in Physiology, Yale University, New Haven, Connecticut.*

To commemorate the centenary of the great Spanish histologist, Santiago Ramón y Cajal, a series of conferences were given in several scientific institutions of Mexico City. Homage was offered by the president of Ateneo Español in Mexico, Dr. Joaquin D'Harcourt, who commented in his article on some of the highlights of Cajal's life. Other papers dealt with the influence of the work of Cajal in modern medicine, neuro-psychiatry, neuro-ophthalmology, and in Spanish and South American science in general. Nieto emphasized that Cajal was the first who described reverberating circuits with a hint about his physiological importance. Rosenblueth noted how Sherrington was able to show the fecundity of the contribution of Cajal. Puche presented the main argument and discussion of the theory of the neurons. Marquez, who collaborated with Cajal to support the theory of the crossing of pathways at the optic chiasm, spoke of the main contributions of Cajal to neuro-ophthalmology. Social and personal aspects of the life of the Spanish histologist are commented on in other articles. The main interest of the book lies in the fact that the majority of the authors were students and friends of Cajal. The book is illustrated with some pictures of Cajal as professor at Valencia in 1885, as professor at Madrid in 1892, at the time of his lectures at Harvard University in 1899, and the year in which he received the Nobel Prize, 1906.

THE WELLCOME HISTORICAL MEDICAL MUSEUM. *Catalogue of an Exhibition illustrating the Medicine of the Aboriginal Peoples in the British Commonwealth,* with an Introduction by E. Ashworth Underwood, M.D., Director of the Museum. Published for the Wellcome Historical Medical Museum by Geoffrey Cumberlege. London, Oxford University Press, 1952. xviii + 58 pp., illus. $.85 (3/6).

Reviewed by GEORGE ROSEN, *Professor and Head of the Department of Public Health Education, Columbia University, New York, New York.*

THIS catalogue deals with the fifth of a series of exhibitions organized by the Wellcome Historical Medical Museum under the direction of Dr. E. Ashworth Underwood. Previous exhibitions have dealt with Edward Jenner, medicine in 1850, prehistoric man in health and disease, and the history of pharmacy. The present catalogue deals with primitive medicine as illustrated by various preliterate peoples of the British Commonwealth. The exhibition is divided into fourteen sections: general knowledge, etiology, pathology, divination and diagnosis, the medicine man and his equipment, non-rational treatment, infliction of wounds, surgery, artificial deforma-

tion, drugs, stimulants and poisons, protective appliances and domestic hygiene, personal hygiene, amulets in disease prevention, protection of mother and child, ceremonial and ritual art. In addition, there is an introduction by Dr. Underwood intended to orient the visitor to the exhibition. The introduction discusses primitive concepts of disease, the medicine man and his methods, treatment including surgery and physical methods, artificial deformation, and preventive measures. The catalogue contains twelve illustrations of items in the exhibition. Many of the items listed are annotated, and the catalogue in general provides a useful reference for anyone interested in primitive medicine. Furthermore, it provides a glimpse of the wealth of material available at the Wellcome Historical Medical Museum.

Platons Timaios, oder Die Schrift über die Natur. Übersetzt und erläutert von Dr. med. Richard Kapferer. Stuttgart, Hippokrates-Verlag, 1952. 112 pp. M. 4.75.

Reviewed by GEORGE L. HENDRICKSON, *Professor Emeritus of Latin and Greek Literature, Yale University, New Haven, Connecticut.*

AMONG the Dialogues of Plato the *Timaeus* has undergone the widest range of critical estimate at the hands of modern students of ancient philosophy. From a position of supremacy among Plato's work, which it long held, it was during the last century, under the impact of modern science, relegated to an inferior place by many scholars, offended by the naïve guesses and speculations of earlier Greek philosophers upon whom Plato has drawn to give a quasi-scientific appearance to his inventions concerning the origins of Earth and the Universe. But new champions have arisen, and once more the *Timaeus* holds a high position in Platonic study.

The present treatise, while from its title it claims to be merely another translation, yet in fact owes its origin to a new suggestion of the sources and influences which lay behind Plato's work. The author's point of view may be expressed briefly in his own words: For the full understanding of the *Timaeus* a knowledge of the whole body of the works of Hippocrates is the necessary presumption. The neglect of this background, he holds, is the source of much of the misapprehension and difficulty which scholars have found in this perplexing treatise. His own competence for this affirmation rests first upon medical training and secondly upon an intimate knowledge of the whole vast body of the Hippocratic corpus scriptorum, of which he has produced and published a complete translation covering some 2,700 pages. The further justification of so large a claim is briefly indicated in the nineteen pages devoted to the introduction, and in the notes to the translation pointing out Hippocratic analogies and influences. In the specific passages of the *Timaeus* which deal with human sickness and its causes, the author's contention seems plausible, nor is there any reason *a priori* why Plato should not have borrowed from his elder contemporary.

But in the larger construction of the dialogue the same probability of Hippocratic influence does not appear. It may be noted here that Dr. Kapferer is not the first to claim a relationship of source between the *Timaeus* and the teachings of Hippocrates. At all events I note that Friedländer (Platonische Schriften II 615. n. 3) cites a treatise of Poschenrieder (1882) which deals with this theme in relation to Plato as a whole, a work which apparently has left little mark upon subsequent study.

The merits of the author's larger contention must be left to specialists in both fields of study. As for the present translation it reveals, so far as tested, competence and clearness of exposition. If this brief notice should attract the attention of any readers to the *Timaeus* itself, it may not be irrelevant to refer them to the fascinating discussion of the dialogue contained in the volume *What Plato Said,* by the late Professor Paul Shorey (University of Chicago Press). For readers or librarians who may be interested in the author's translation of Hippocrates, note: *Die Werke des Hippokrates,* 5 vols., Stuttgart, Hippokrates-Verlag, 1934-40.

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JOHN F. FULTON, M.D., is Editor of this journal.

IRVINE JOHN HUNTER, M.B., was Reginald Maney Lake Research Scholar and Amy Laura Bonamy Scholar in the Department of Pathology, University of Sydney, and is now working at the Bernhard Baron Institute, London Hospital, London, England.

HERBERT S. KLICKSTEIN, M.D., has just completed his interneship at the University of Pennsylvania Graduate Hospital and has been awarded a year's fellowship at the Institute of the History of Medicine at Johns Hopkins University.

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